

ROYAL BOTANIC GARDENS, KEW.

BULLETIN
OF
MISCELLANEOUS INFORMATION.

No. 1]

[1925

I.—FLORA HIGHDOWNENSIS.

Major F. C. Stern's garden at Highdown, a few miles west of Worthing, stands on a slope of the Sussex Downs at about 250 ft. above the sea, which it faces. The most interesting part of the garden is an area of about two acres, the site of an abandoned chalk pit the cliffs of which afford useful shelter from the north as well as from the east and west. At the base of these cliffs the soil is mostly fallen chalk debris; in other parts the rock chalk is covered with a layer of loam which varies in depth. There is, however, rarely more than one foot of it, generally less. No garden, therefore, could be found to give a better illustration of what can be grown successfully on a thoroughly and unmitigatedly chalky site. Major Stern has got together an extremely interesting and varied collection of trees and shrubs and he is to be congratulated on creating a very charming garden on what most people would have regarded as a most unpromising spot. Highdown now constitutes an admirable object lesson for those whose gardens stand on a similar formation.

Frequent application is made to Kew for advice as to what may best be grown in such places and it has appeared to us that a printed list of the woody plants, whose value Major Stern has proved, would be very useful to such correspondents, providing them with a much fuller answer than the available time of the staff would otherwise permit. Major Stern has added a list of his lilies and irises, which make a striking feature of the garden.

It is desirable to point out that in such a site as this at Highdown, where the bed-rock is a few inches only below the surface, it is not of much use merely to dig out pockets in the chalk, fill them with soil, and plant in that. Major Stern found that shrubs and trees succeeded quite well for a few years in such pockets, but ultimately became unhealthy. He now breaks up the hard chalk to a depth of some two or three feet, and it is undoubtedly to the provision of this larger, freer root-run that the health and luxuriance of his plants are largely due.

We are greatly indebted to Major Stern for the trouble he has taken in compiling this list. In an accompanying letter he writes :

"The lists give the names of the trees, shrubs, lilies, irises and a few interesting herbaceous plants, which grow on the chalk soil at Highdown, Goring-by-Sea, Sussex. No plant has been put in these lists unless it has been well tried and shows no objection to the lime. *Rhododendron rubiginosum* is included in the list as it has grown and flowered on this soil for over three years without showing any sign of injury from the lime."

"Chinese Rhododendrons, such as *R. oreotrephes*, *R. Trailianum* and others from the Likiang Range, are being tried, but it is not possible to tell yet whether they are truly chalk plants or not. It will be noticed that the flora is composed mostly of plants from China and New Zealand and some hardy plants from South America and the Mediterranean region."

In planting the Rhododendrons Major Stern has not relied on making pockets of peat in the chalk, but after breaking up the subsoil and rocky chalk, as already described, he has added a quantity of well-rotted leaf mould and mixed this up with the broken-up soil. The Rhododendrons have been planted in this mixture of leaf mould and chalky loam and beyond giving top dressings of leaf mould annually they receive no other treatment. The health of *R. rubiginosum* under these conditions is quite remarkable.

A very extensive collection of alpine and herbaceous plants also is grown at Highdown but as, with comparatively few exceptions, these are quite at home on limestone it has not been thought necessary to include them.

<i>Abelia grandiflora</i>	<i>Aralia chinensis</i>
<i>floribunda</i>	<i>Araujia sericofera</i>
<i>Schumannii</i>	<i>Arbutus Unedo</i>
<i>triflora</i>	<i>Aristolochia Sipho</i>
<i>Abies Pinsapo</i>	<i>Aristotelia racemosa</i>
" <i>var. glauca</i>	<i>Artemisia arborescens</i> (?)
(<i>Forrest</i> 10225)	<i>Arundinaria japonica</i>
<i>Abutilon vitifolium var. album</i>	<i>nitida</i>
<i>Acacia dealbata</i>	<i>Azara microphylla</i>
<i>longifolia</i>	<i>Berberidopsis corallina</i>
<i>Acer circinatum</i>	<i>Berberis Aquifolium</i>
<i>Davidii</i>	" <i>var. aldenhamensis</i>
<i>griseum</i>	<i>Bealei</i>
<i>Negundo var. aureum</i>	<i>buxifolia</i>
<i>palmatum</i>	<i>candidula</i>
" <i>var. dissectum</i>	<i>Darwinii</i>
" <i>var. pinnatifolium</i>	<i>dictyophylla</i>
<i>Pseudo-platanus</i>	<i>Gagnepainii</i>
<i>tataricum</i>	<i>Hookeri var. latifolia</i>
<i>tenellum</i>	<i>Neubertii</i>
(<i>Farrer</i> No. 351)	<i>pallens</i>
<i>Aegle sepiaria</i>	<i>Sargentiana</i>
<i>Aesculus carnea var. Briotii</i>	<i>Staphiana</i>
<i>Hippocastanum</i>	<i>stenophylla</i>
<i>Akebia quinata</i>	" <i>var. compacta</i>
<i>Alnus glutinosa</i>	<i>Thunbergii</i>

- Berberis verruculosa*
vulgaris var. foliis-purpureis
Wilsonae
 (Wilson No. 1060)
 (" " 1849)
 (Farrer No. 356)
 (" " 357)
 (" " 358)
 (" " 361)
Beschorneria yuccoides
Betula alba
 " *var. fastigiata*
utilis var. Prattii
 (Purdom No. 158)
Boenninghausenia albiflora
Boldoa fragrans
Bowkeria Gerrardiana
Buddleia alternifolia
amplissima
auriculata
Colvillei
cylindrostachya
Fallowiana
Farreri
Forrestii
glabrescens
Hemsleyana
Lindleyana
nivea
variabilis
Buxus sempervirens
Caesalpinia Gilliesii
Callicarpa japonica
Callistemon brachyandrus
speciosus
Carmichaelia flagelliformis
Carpinus Betulus var. incisa
Caryopteris Mastacanthus
tangutica
Ceanothus dentatus
floribundus
 " *Gloire de Versailles* "
 " *Indigo* "
rigidus
Veitchianus
Cedrus atlantica var. glauca
Ceratostigma Griffithii
plumbaginoides
Willmottiae
Chimonanthus fragrans
Choisya ternata
Cistus corbariensis
creticus
crispus
 " *" Sunset "*
 " *" Silver pink "*
cyprius
ladaniferus
laurifolius
Loretii
purpureus
salvifolius
 (18230.)
- Clematis alpina*
Armandii
coccinea
Flammula
integrifolia var. Durandii
Jackmanii, in variety
macropetala
montana
 " *var. rubens*
 " *var. Wilsonii*
tangutica
uncinata
Vitalba
Clerodendron foetidum
trichotomum
Clianthus puniceus
Cneorum tricoccum
Convolvulus Cneorum
mauritanicus (herbaceous)
Coprosma Petriei
Cornus capitata
sanguinea
Corokia virgata
Coronilla glauca
 " *var. pygmaea*
Correa magnifica
Cotoneaster acutifolia
Dammeri
Henryana
horizontalis
lactea
microphylla
multiflora
 " *var. calocarpa*
Cupressus Lawsoniana var.
Fletcheri
lusitanica
macrocarpa
nootkatensis
Cryptomeria japonica var. elegans
Cydonia japonica var. Simonii
Maulei
 " *var. alpina*
Wilsonii
Cytisus Ardoinii
Dallimorei
fragrans
monspessulanus
nigricans
praecox
proliferus
scoparius var. Andreanus
Daphne Blagayana
Cneorum
Laureola
retusa
tangutica
Davidia laeta
Dendromecon rigidum
Desfontainea spinosa
Desmodium canescens
Deutzia albida

- Diervilla floribunda *var.* "Eva Rathke"
 Diospyros Lotus
 Dipelta floribunda
 Diplacus glutinosus
 Drimys aromatica
 Winteri
 Eceremocarpus scaber
 Embothrium coccineum
 Escallonia "Donard Seedling"
 Ingramii
 langleyensis
 macrantha
 rubra
 Ercilla volubilis
 Erica arborea
 australis
 carnea
 darleyensis
 mediterranea
 Eriobotrya japonica
 Eucalyptus MacArthuri
 Gunnii *var.* whittingehamensis
 Eucryphia cordifolia
 "Nymansay" (cordifolia × pinnatifolia)
 Euonymus alatus
 europaeus
 radicans *var.* kewensis
 Eupatorium ligustrinum
 Euphorbia sikkimensis
 Wulfenii
 Exochorda Albertii *var.* macrantha
 Fagus sylvatica
 Fabiana imbricata
 Feijoa Sellowiana
 Ficus Carica
 Forsythia suspensa
 " *var.* atrocaulis
 viridissima
 Fraxinus excelsior
 Ornus
 Fuchsia Colensoi
 gracilis
 macrostemma
 microphylla
 Riccartonii
 thymaeifolia
 Genista aethnensis
 dalmatica
 hispanica
 tinctoria
 virgata
 Griselinia littoralis
 Hamamelis mollis
 Hedera Helix
 Hedysarum multijugum
 Helianthemum alyssoides
 formosum
 halimifolium
 Libanotis
 oeymoides
 Helianthemum vulgare, and hybrids
 Helichrysum antennarium
 Hibiscus syriacus
 Hoheria populnea
 " *var.* lanceolata
 Hydrangea petiolaris
 Hypericum calycinum
 patulum *var.* Henryi
 Idesia polycarpa
 Ilex Aquifolium
 corallina
 insignis
 Pernyi
 Wilsonii
 Indigofera amblyantha
 Potaninii
 Jasminium Beesianum
 primulinum
 Juniperus communis
 " *var.* hibernica
 chinensis *var.* Pfitzeri
 macrocarpa
 procera
 Laburnum vulgare
 Lapageria rosea
 " *var.* albiflora
 Laurelia serrata
 Laurus nobilis
 Lavandula dentata
 spicata
 vera *var.* nana
 "Wargrave dwarf"
 Lavatera Olbia
 Leptodermis Purdomii
 Leptospermum scoparium
 Leycesteria formosa
 Ligustrum lucidum
 vulgare
 Linum arboreum
 Lobelia laxiflora
 Liriodendron Tulipifera
 Lippia citriodora
 Lomatia ferruginea
 Lonicera Hemsleyana
 Hildebrandtii
 nitida
 shensiensis
 Magnolia Delavayi
 grandiflora
 Lennei
 Wilsonii
 Melaleuca Preissiana
 Microglossa albescens
 Muehlenbeckia complexa
 Mutisia Clematis
 decurrens
 Myrtus communis
 " *var.* tarentina
 Luma
 Ugni
 Nandina domestica
 Notospartium Carmichaeliae

- Nothofagus obliqua*
procera
Olearia argophylla
chathamica
Forsteri
Haastii
ilicifolia
insignis
macrodonta
nummularifolia
purpurata
ramulosa
semidentata
Solandri
stellulata
Traversii
Osmanthus Delavayi
Osteomeles Schwerinii
Paulownia imperialis
Paeonia Delavayi
Moutan
Pentstemon Scouleri
Perowskia atriplicifolia
Photinia sp.
Philadelphus mandshuricus
Phillyrea angustifolia
Philesia buxifolia
Phlomis fruticosa
Phormium Cookianum
Pinus Laricio var. *austriaca*
leucodermis
montana
radiata
sylvestris
Pittosporum tenuifolium
Tobira
Plagianthus Lyallii
Plagiospermum sinense
Polygonum baldschuanicum
Populus lasiocarpa
nigra
trichocarpa
Potentilla fruticosa var. *Farreri*
Prostanthera rotundifolia
Prunus Avium var. *flore pleno*
Davidiana, red and white
dehiscens
Laurocerasus
lusitanica
Prunus Pissardii
serrulata var. *hisakura*
Punica Granatum
Pyracantha coccinea
crenulata
Gibbsii
yunnanensis
Pyrus Eleyi
Malus
Scheideckeri
Vilmorinii
(Farrer No. 778)
Pseudotsuga Douglasii var. *glauca*
- Quercus Ilex*
Raphithamnus cyanocarpus
Rhododendron hirsutum
rubiginosum
Rhodothamnus Chamaecistus
Rhus cotinoides
Cotinus
glabra
„ var. *laciniata*
typhina
Ribes Gordonianum
nigrum
sanguineum
speciosum
vulgare
Romneya Coulteri
Rosa "Anemone"
Banksiae
filipes
Hugonis
indica
laevigata
Lyellii
moschata
„ var. *Brunonii*
Moyesii
omelensis
„ var. *atrosanguinea*
Roxburghii var. *hirtula*
rubrifolia
Sweginzowii
Wichuraiana
Rosmarinus officinalis
„ var. *Robinsonii*
„ var. *prostrata*
Rubus deliciosus
Giraldianus
Ruscus aculeatus
Rodgersia pinnata (herbaceous)
Salix viminalis
Salvia Pittieri
Santolina Chamaecyparissus
rosmarinifolius
Sarcococca ruscifolia
Senecio clivorum (herbaceous)
compactus
Haastii
laxifolius
rotundifolius
Sophora viciifolia
Solanum crispum
jasminoides
Spartium junceum
Spiraea Aitchisonii
arborea
canescens
japonica var. "Anthony Waterer"
Lindleyana
(Farrer No. 457)
Staphylea Coulombieri
Stranvaesia undulata
Styrax japonica

Syringa Emodi
 Julianae
 persica *var.* alba
 Potaninii
 vulgaris, and varieties
 Tamarix hispida
 pentandra
 Taxus baccata
 Tecoma radicans
 Tetracentron sinense
 Teucrium fruticans
 Trachycarpus excelsus
 Tricuspidaria dependens
 Ulex europaeus *var.* flore pleno
 Ulmus campestris
 Veronica Andersonii
 angustifolia
 " *var.* rosea
 " (blue)
 Bakeri
 Bidwillii
 " *var.* vera
 epacridea
 Catarractae
 chathamica
 Cookiana
 cupressoides
 Dieffenbachii
 diosmifolia
 edinensis
 Girdwoodiana
 glauco-coerulea
 Hectori
 Hulkeana
 Kirkii

Veronica Lavaudiana
 Lewisii
 Lindsayi
 Lyallii
 macrocarpa
 " Mrs. Winder "
 parviflora
 pimelioides *var.* minor
 salicifolia
 speciosa, and hybrids
 Traversii
 Viburnum bitchiuense
 Carlesii
 coriaceum
 Davidii
 fragrans
 " *var.* album
 Lantana
 macrocephalum
 odoratissimum
 Opulus *var.* sterile
 propinquum
 rhytidophyllum
 Tinus *var.* lucidum
 tomentosum *var.* Mariesii
 " *var.* plicatum
 Vinca difformis
 major
 Vitis Coignetiae
 Henryana
 Wistaria chinensis
 multijuga
 Yucca filamentosa
 Whipplei

Lilium candidum
 " Salonika variety
 centifolium
 chalcedonicum
 Farreri
 Henryi
 Martagon *var.* dalmaticum
 " *var.* album
 sulphureum

Lilium nepalense ? (*Farrer*
 No. 1122)
 pardalinum
 regale
 Szovitzianum
 testaceum
 Thayerae
 tigrinum
 Willmottiae

Iris chysographes
 Delavayi
 foetidissima
 Forrestii
 fulvala
 germanica, in variety
 graminea
 Hoogiana
 japonica
 Mariæ
 monspur

Iris orientalis
 pumila
 regeliocyclus, hybrids
 sibirica
 Sintenisii
 Susiana
 tingitana
 unguicularis
 Wattii
 xiphioides
 Xiphium

II.—CONTRIBUTIONS TO THE FLORA OF SIAM.*

Additamentum XV.

W. G. CRAIB.

Talauma betongensis Craib [Magnoliaceae-Magnolieae]; a *T. Rabaniana* Hook. f. et Th., foliorum nervis lateralibus numerosioribus, a *T. Hodgsonii* Hook. f. et Th., fructu pro longitudine latiore, et a *T. singapurense* Ridl., foliis subtus haud ad costam pubescentibus et pedicellis multo brevioribus recedit.

Arbor circa 8 m. alta (ex Kerr); ramuli (juvenilibus deficientibus) floriferi sat robusti, glabri, fusco-olivacei, conspicue annulati, lenticellis paucis conspicuis instructi. *Folia* oblongo-oblanceolata, rarius oblanceolata vel obovato-oblanceolata, apice obtusorotundata vel rotundata, basi cuneata vel subacuminato-cuneata, 15–34 cm. longa, 4.5–14.5 cm. lata, coriacea, pagina utraque glabra, saepe subnitida, costa supra parum prominente subtus valde prominente, nervis lateralibus utrinque 14–18 aliis vix minus conspicuis hic et illic additis rectis bene intra marginem anastomosantibus supra parum elevatis subtus prominentibus, nervulis rete pagina utraque parum elevatum efficientibus, margine integra, petiolo basi valde incrassato 2.5–5 cm. longo glabro suffulta, areola stipulari petiolo subaequilonga. *Flores* terminales, alabastro uno tantum viso pedicello vix 1 cm. longo suffulto. *Fructus* ovatus vel subobovatus, 8.5 cm. longus, 7.5 cm. diametro, carpellis fuscis plus minusve pallide lenticellatis apice erostratis vel rostro valido adscendente subrecto instructis circa 1.5–2.5 cm. longis antice 1–1.5 cm. latis apertis postice ad 3.5 cm. latis.

Pattani, Betong, c. 400 m., evergreen forest, Kerr 7449.

Siamese name. Leng Teng (ex Kerr).

The Pattani plant is very similar to an unnamed specimen in Herb. Kew. (Selangor, Ridley 15590!).

Sageraea reticulata Craib [Anonaceae-Uvarieae]; ab affini *S. Thwaitesii* Hook. f. et Th., cui floribus hermaphroditis carpellisque glabris affinis, petiolis et pedicellis brevioribus, ovulis circa 12 recedit.

Arbor circa 10 m. alta (ex Kerr); ramuli subgraciles, glabri, cortice primo pallido mox brunneo demum cinerascete reticulato obtecti. *Folia* oblongo-lanceolata vel oblonga, apice obtusa vel obtuse subacuminata, basi saepe inaequilateralia, cuneata vel rotundato-cuneata, ad 19 cm. longa et 5.7 cm. lata, rigide chartacea vel coriaceo-chartacea, glabra, subtus pallidiora, nervis lateralibus utrinque 12–14 supra conspicuis fere subprominulis subtus prominulis intra marginem anastomosantibus, rete pagina utraque subconspicuo, petiolo 5–6 mm. longo supra canaliculato suffulta. *Flores* lutei (ex Kerr), e ramis orti, subsolitarii, pedunculo communi

* Continued from K.B., 1924, p. 98.

circa 5 mm. longo bracteato, pedicellis 6–10 mm. longis superne gradatim incrassatis ebracteolatis. *Sepala* rotundato-oblonga, 2.5 mm. longa, 2.75 mm. lata, ciliata. *Petala* exteriora elliptica, concava, 8 mm. longa, 6.5 mm. lata, ciliolata, aliter glabra, interiora ovato-rotundata, concava, 5 mm. longa, glabra. *Stamina* 3-seriata (circa 18), 1.75–2 mm. alta, connectivo lato crasso apice plus minusve triangulari obliquo. *Carpella* duo (an semper?), 1.5 mm. alta, glabra, in stylum brevem sat crassum angustata, stigmatibus parvis, ovulis circa 12 biseriatis. *Fructus* vix maturus ambitu oblongo-obovatus, basi in stipitem brevem contractus.

Saraburi, Mênam Sak, c. 40 m., evergreen grove, *Kerr* 7048.

This species is also very similar to the Bornean *S. lanceolata* Miq. which has thicker leaves, not reticulate above, and smaller petals.

Cyathostemma longipes Craib [Anonaceae-Uvarieae]; a speciebus aliis carpellis biovulatis recedit.

Ramuli volubiles, primo pilis stellatis subferrugineis sparse tecti, demum glabri, cortice cinereo reticulato inconspicue lenticellato obtecti. *Folia* oblongo-oblonga, apice acuminata vel caudato-acuminata, obtusa, basi rotundata, saepe inaequilateraliter, ad 20 cm. longa et 6.3 cm. lata, chartacea, supra ad costam nervosque laterales breviter crispatis pubescentia, subtus ad costam nervosque laterales pilis stellatis sparsius, aliter hic et illic instructa, nervis lateralibus utrinque 12 intra marginem anastomosantibus supra conspicuis subtus prominentibus, reticulatione pagina utraque subprominula; petiolus circa 8 mm. longus, supra canaliculatus, subtus transverse corrugatus, indumento ei ramulorum simili tectus. *Pedunculus* communis supra-axillaris, brevis, lignosus; pedicelli ad 8 cm. longi, fusci, pilis paucis brevibus stellatis brunneis hic et illic instructi. *Sepala* late ovata, obtuse acuminata, circa 5 mm. longa et lata, dorso parce stellato-pubescentia, ciliolata. *Petala* exteriora imbricata, late ovata, circa 2 cm. longa et 1.7 cm. lata, coriacea, sicca nigra, utrinque puberula, interiora exterioribus similia sed minora. *Stamina* circa 12-seriata, connectivo obliquo plano papilloso. *Carpella* numerosa, stipite brevi incluso 1 mm. alta, glabra; stylus 1.5 mm. longus, inferne dorso pubescens, latere altero canaliculatus; ovula 2, basalia.

Udawn, Pu, c. 200 m., evergreen forest, *Kerr* 8607.

Artabotrys brevipes Craib [Anonaceae-Unoneae]; *A. odoratissimo* R. Br., peraffinis sed ramulis iuventute adpresse pubescentibus, floribus breviter pedicellatis recedit.

Ramuli iuventute adpresse pubescentes, mox glabri, cortice reticulato brunneo vel cinereo-brunneo inconspicue lenticellato obtecti. *Folia* lanceolato-oblonga vel elliptico-oblonga, apice obtuse acuminata, interdum fere caudato-acuminata, basi cuneata vel subacuminata, 6.5–12 cm. longa, 2.5–4.2 cm. lata, chartacea, supra viridia, subtus parum pallidiora, iuvenilia supra glabra,

subtus ad costam dense adpresse pubescentia, ciliata, matura subtus ad costam pilis paucis instructa, nervis lateralibus utrinque 10–12 supra conspicuis vel subprominulis subtus prominulis bene intra marginem anastomosantibus, reticulatione supra conspicua subtus prominula, petiolo circa 5 mm. longo supra canaliculato suffulta. *Pedunculi* oppositifolii, hamati, complanati, lignosi, circa 4-flori, pilis adpressis paucis instructi; pedicelli sat robusti, circa 6 mm. longi, superne incrassati, parce adpresse pubescentes; flores subvirides, odorati (ex Kerr). *Sepala* ovata, obtusa, ad 11 mm. longa et 8.5 mm. lata, utrinque sed extra sparsius breviter adpresse pubescentia. *Petala* exteriora ad 3.3 cm. longa et 1 cm. lata, utrinque breviter pubescentia nisi parte basali concava extra breviter sericea intra glabra, supra partem concavam constricta, interiora exterioribus similia sed paulo minora. *Stamina* brevina, connectivo apice triangulari subumbonato. *Carpella* glabra, stylis subaequilonga.

Udawn, c. 200 m., mixed forest, Kerr 8592.

Artabotrys oblanceolatus Craib [Anonaceae-Unoneae]; ab affini *A. Kurzii* Hook. f. et Th., foliis angustioribus, pedicellis brevioribus, staminibus haud apiculatis, carpellis glabris recedit.

Ramuli graciles, scandentes, primo pilis rufis adpresso-patentibus vel plus minusve adpressis densius tecti, mox glabrescentes, cortice brunneo vel fusco inconspicue lenticellato obtecti. *Folia* oblanceolata, rarius oblongo-oblanceolata, apice obtusa vel obtuse subacuminata, basi parum inaequilateralia, cuneata vel rotundata, usque ad 13.5 cm. longa et 3.7 cm. lata, chartacea, matura supra ad costam breviter crispatis pubescentia, subtus pallidiora, ad costam nervosque laterales parce adpresse rufo-hirsuta, aliter glabra vel basem versus pilis paucis rufis instructa, nervis lateralibus utrinque circa 10 subrectis patentibus bene intra marginem anastomosantibus supra conspicuis vel subprominulis subtus subprominentibus, nervulis rete laxum pagina utraque conspicuum efficientibus, petiolo 3–4 mm. longo supra canaliculato adpresse rufo-hirsuto suffulta. *Pedunculi* oppositifolii, mox conspicue arcuati, compressi, adpresse pubescentes, uniflori; pedicelli circa 5 mm. longi, superne incrassati, indumento ei pedunculi simili tecti. *Sepala* 3, ovata, apicem versus angustata, 7 mm. longa, 5.5 mm. lata, utrinque sparse adpresse pubescentia, ciliata, nervosa. *Petala* exteriora oblongo-lanceolata, obtusa, ad 1.5 cm. longa et 7.5 mm. lata, utrinque, parte basali intra concava excepta, breviter pubescentia, interiora exterioribus subaequilonga, iis angustiora. *Stamina* connectivo apice haud apiculato. *Carpella* glabra, stylo subaequalia.

Saraburi, Mênam Sak, c. 30 m., evergreen grove, Kerr 7056.

Artabotrys spinosus Craib [Anonaceae-Unoneae]; species nova spinis saepissime geminis evolutis distincta.

Arbor ad 6 m. alta (ex Kerr); ramuli primo ferrugineo-pubescentes, cito glabrescentes, mox omnino glabri, cortice

brunneo vel cinereo-brunneo striato inconspicue lenticellato obtecti, spinis axillaribus saepissime geminis validis ad 3 cm. longis ramulum solitarium gerentibus rarissime nudis evolutis. *Folia* oblongo-obovata, rarius obovata, apice late retusa vel subtruncata, basi cuneata vel rotundato-cuneata, rarius rotundata, interdum inaequilateralia, ad 8·7 cm. longa et 4 cm. lata, rigide chartacea, pagina superiore primo ad costam adpresse ferrugineo-pubescentia, cito glabra, inferiore ad costam, aliter sparse, adpresse ferrugineo-pubescentia, matura ad costam sparse adpresse ferrugineo-pubescentia, nervis lateralibus utrinque 7–8 rectis bene intra marginem anastomosantibus pagina utraque prominulis, nervulis rete laxum utrinque prominulum efficientibus, margine cartilaginea, plus minusve ciliata, petiolo circa 3 mm. longo adpresse ferrugineo-pubescente suffulta. *Pedunculus* oppositifolius, rectus, mox lignosus et vix curvatus, circa 5 mm. longus, indumento ei ramulorum simili tectus, 2–3-florus; pedicelli ad 1·5 cm. longi, primo densius ferrugineo-pubescentes, basi bracteati. *Sepala* circa 6 mm. longa et 5 mm. lata, utrinque dense adpresse ferrugineo-pubescentia, mox recurva et margine revoluta. *Petala* ad 2 cm. longa et 1·1 cm. lata, limbo utrinque breviter subsparse pubescentia, parte basali concava intra summo apice dense breviter pubescentia, aliter glabra, extra sericea. *Stamina* conspicue apiculata. *Carpella* glabra, stylo brevi.

Ubon, c. 100 m., open scrub along river bank, *Kerr* 8338.

***Polyalthia socia* Craib** [Anonaceae-Unoneae]; ab affini *P. Beccarii* King, foliis glabris, nervis lateralibus utrinque 11–14 recedit.

Arbor circa 5 m. alta (ex *Kerr*); ramuli, iuvenilibus deficientibus, glabri, cortice brunneo vel pallide brunneo haud conspicue lenticellato reticulato obtecti. *Folia* oblongo-oblongo-lanceolata vel oblongo-lanceolata, apice obtusa vel breviter obtuse acuminata, basi cuneato-rotundata, saepe inaequilateralia et auriculata, ad 16 cm. longa et 5·5 cm. lata, chartacea vel rigide chartacea, matura glabra, subtus pallidiora, subargentea, nervis lateralibus utrinque 11–14 supra interdum subconspicuis subtus prominulis intra marginem anastomosantibus, nervulis paucis subtus conspicuis, reticulatione vix conspicua; petiolus circa 4 mm. longus, fuscus, subteres, supra late canaliculatus, subtus transverse corrugatus. *Flores* pallide virides (ex *Kerr*), e tuberculis supra-axillaribus orti, pedunculo communi brevi, pedicellis circa 13 mm. longis superne incrassatis verruculosi pilis sparsissime instructis. *Sepala* oblato-deltaidea, breviter acuminata, 1·25 mm. longa, 2·5 mm. lata, ciliata, sat dura. *Petala* inter se subaequalia, lanceolata, acuta, interiora ad 3 cm. longa et 6 mm. lata, exteriora paulo latiora, circa 2·5 cm. longa, inferne 5-nervia, superne dorso carinato-uninervia, nervis extra conspicuis intra obsoletis, dorso pilis brevibus adpressis sparse instructa, praesertim inferne verruculosa, intra glabra, laevia. *Stamina* filamentis brevibus

inclusis 1.75 mm. longa, connectivo apice truncato. *Carpella* 1.5 mm. alta, adpresse pilosa, ovulis 2.

Pattani, Bukit, c. 400 m., evergreen forest, *Kerr* 7101.

Oxymitra discolor *Craib* [Anonaceae-Mitrephoreae]; ab *O. glauca* Hook. f. et Th. et *O. unonifolia* Hook. f. et Th., foliis pro latitudine longioribus recedit.

Frutex scandens; ramuli iuventute dense breviter crispatim ferrugineo-pubescentes, mox puberuli, demum glabri, cortice fusco reticulato interdum conspicue parvi-lenticellato obtecti. *Folia* lanceolato-oblonga, oblonga, vel rarius oblanceolato-oblonga, apice acuminata vel subacuminata, obtusa, basi rotundata, interdum late cuneata, ad 17 cm. longa et 5.5 cm. lata, chartacea, subtus glauca vel subglauca, pagina superiore iuventute sericea, matura ad costam crispatim puberula, aliter glabra, inferiore primo dense adpresse ferrugineo-pubescentia, demum pilis brevibus ferrugineis sparse instructa, costa supra impressa subtus prominente, nervis lateralibus utrinque circa 13 intra marginem anastomosantibus supra vix conspicuis subtus subprominentibus, nervis transversis subtus prominulis, petiolo valido circa 5 mm. longo suffulta. *Flores* solitarii, supra-axillares, pedicello circa 4 mm. longo indumento ei ramulorum simili tecto medio bracteola circa 2 mm. longa instructo suffulti. *Sepala* late ovata, obtusa, circa 8 mm. longa et 7 mm. lata, utrinque sparse adpresse pubescentia, 7-nervia. *Petala* exteriora coriacea, plus minusve oblongo-lanceolata, obtusa, ad 3.5 cm. longa et 1 cm. lata, utrinque sparse adpresse pubescentia, interiora pyramidal-coalita, vix 1 cm. longa, dorso breviter sparse pubescentia, intra glabra. *Stamina* brevia, connectivo apice truncata. *Carpella* ferrugineo-puberula; ovula solitaria.

Kaw Chang, Salak Kawk, near sea-level, evergreen forest, *Kerr* 6910. Kaw Chang, scrub jungle, *Marcan* 1321.

Goniiothalamus expansus *Craib* [Anonaceae-Mitrephoreae]; *M. Kunstleri* King affinis sed calyce multo minore inter alia differt.

Frutex circa 3 m. altus (ex *Kerr*); ramuli glabri, iuventute plus minusve flexuosi, mox cortice cinereo vel subfusco reticulato obtecti. *Folia* elliptico-oblonga vel elliptico-oblanceolata, apice obtuse acuminata vel caudato-acuminata, basi cuneata vel acuminata, 14–20 cm. longa, 5–8.5 cm. lata, chartacea, glabra, subtus pallidiora, costa supra impressa subtus prominente, nervis lateralibus utrinque 12–14 bene intra marginem conspicue anastomosantibus supra impressis subtus prominulis, nervulis supra rete laxum plus minusve conspicuum efficientibus subtus reticulationem vix efficientibus, margine recurva, petiolo circa 7 mm. longo supra canaliculato subtus transverse corrugato suffulta. *Flores* virides (ex *Kerr*), e ramulis orti, pedunculo cum pedicello circa 2 cm. longo glabro. *Sepala* ovata, subacute acuminata, 8 mm. longa, 4.5 mm. lata, submembranacea, dorso glabra, verruculosa, intra glabra, pauperius ciliata, 5-nervia, costa

dorso conspicua, nervis lateralibus subconspicuis. *Petala* exteriora lanceolata, apice longe attenuato-acuminata, subacuta, 2·7 cm. longa, 0·5 cm. lata, basi carnosa, aliter tenuia, parcissime ciliata, aliter glabra, interiora inter se cohaerentia, oblongo-obovata, apice obtuse caudato-acuminata, 9 mm. longa, 4 mm. lata, praesertim superne ciliata, valde carnosa. *Stamina* 1·75 mm. longa, connectivo producto apice rotundato papilloso haud acuminato. *Carpella* circa 1·5 mm. alta, densius ferrugineo-pubescentia, stylo 2·25 mm. longo glabro, stigmatibus 2-lobato, lobis membranaceo-complanato-expansis ad 1·75 mm. latis; ovula solitaria.

Pattani, Banang Sta., c. 100 m., evergreen forest, *Kerr* 7387.

Melodorum parvifolium Craib [Anonaceae-Xylopieae]; a *M. fulgente* Hook. f. et Th. et *M. Griffithii* Hook. f. et Th. foliis multo minoribus haud acuminatis, stigmatibus glabris recedit.

Frutex volubilis; ramuli primo ferrugineo-tomentosi, mox glabrescentes, cortice fusco-brunneo reticulato conspicue lenticellato obtecti. *Folia* oblonga vel lanceolata-oblonga, apice rotundata vel subtruncata, emarginata, basi rotundata vel cuneato-rotundata, ad 6·5 cm. longa et 2·7 cm. lata, subcoriacea, pagina superiore ad costam tomentella, aliter iuvenilia tantum parce pubescentia, inferiore pallidiora, adpresse molliter pilosa vel parce pubescentia, nervis lateralibus utrinque 13-15 intra marginem anastomosantibus supra subconspicuis interdum leviter impressis subtus prominentibus, petiolo ad 8 mm. longo supra canaliculato indumento ei ramulorum simili tecto suffulta. *Cymae* oppositifoliae; pedunculus communis brevis, robustus, uni- vel pluri-florus; pedicelli 5 mm. longi, robusti, ferrugineo-tomentosi, inferne bracteolati. *Sepala* ovata, obtusa, 2 mm. longa, extra dense adpresse ferrugineo-pubescentia vel tomentella, intra glabra. *Petala* exteriora ovata vel lanceolata-obovata, apicem versus angustata, 11 mm. longa, 7 mm. lata, coriacea, extra ferrugineo-tomentosa, intra glabra et verrucosa, interiora ovata, apicem versus angustata, 9 mm. longa, 5 mm. lata, glabra nisi dorso medio superne cinereo-puberula, extra verrucosa, intra verruculosa et plus minusve lamellata. *Carpella* vix 2 mm. longa, dense adpresse pubescentia, stylo carpello paulo brevior cum stigmatibus subaequaliter bilobato glabro. *Fructus* e carpellis globosis vel ellipsoideo-globosis ad 1·7 cm. diametro breviter ferrugineo-tomentellis stipite 1·5 cm. longo tomentello suffultis constitutus; semina 4, nitido-brunnea, 1 cm. longa.

Loi, Kao Krading, c. 1200 m., open evergreen forest, *Kerr* 8698.

Miliusa elongata Craib [Anonaceae-Miliuseae]; a *M. cuneata* Craib, petiolis pedicellisque longioribus, floribus maioribus, a *M. campanulata* Pierre, ramulis haud glabris recedit.

Frutex circa 3 m. altus (ex *Kerr*); ramuli iuventute densius breviter ferrugineo-pubescentes, mox puberuli vel fere glabri, cortice rubro-brunneo vel cinereo-brunneo reticulato-

striato obtecti, lenticellis vix conspicuis. *Folia* oblongo-oblanceolata vel oblanceolata, apice acuminata, obtusa vel costa excurrente apiculata, basi cuneata, parum inaequilateralia, ad 13·5 cm. longa et 4·5 cm. lata, chartacea, sicco saepissime supra fusciscentia et subtus viridia, pagina superiore iuventute ad costam dense breviter pubescentia, mox puberula vel fere glabra, aliter glabra, inferiore primo sparse adpresse pubescentia, mox plus minusve glabrescentia, primo ciliolata, nervis lateralibus utrinque circa 12–14 tenuibus intra marginem anastomosantibus supra vix conspicuis subtus subprominulis, costa supra impressa subtus prominente, petiolo supra plus minusve canaliculato subtus verruculoso indumento ei ramulorum simili tecto suffulta. *Pedunculus* communis 2–3 mm. longus, pilis paucis ferrugineis instructus; pedicelli saepissime solitarii, 4·5 cm. longi, puberuli, basem versus bracteola solitaria instructi; flores viridi-albi (ex Kerr). *Sepala* late lanceolata, acutiuscula, 4 mm. longa, 2 mm. lata, extra adpresse pubescentia, intra puberula, ciliata. *Petala* exteriora sepalis conformia sed fere duplo longiora et paulo angustiora, indumento ei sepalorum simili instructa, interiora basi ad 5 mm. inter se connata, lobis oblongo-ovatis apice obtusis ad 14 mm. longis et 11 mm. latis, basi saccata, dorso glabra, intra puberula, plus minusve ciliolata. *Stamina* circa 4-seriata, filamentis exterioribus 0·6 mm. longis interioribus gradatim brevioribus. *Carpella* 1·5 mm. alta, parce adpresse pubescentia; stigmata circa 0·6 mm. longa, parce puberula; ovula solitaria, sub-basilaria.

Nakawn Sawan, Klawng Kung, c. 300 m., evergreen forest, Kerr 6050.

Orophea fusca Craib [Anonaceae-Miliuseae]; ab affini *O. Desmos* Pierre, floribus maioribus, carpellis 6-ovulatis recedit.

Arbor circa 4 m. alta (ex Kerr); ramuli iuventute graciles, pilis plus minusve adpressis tecti, cito glabrescentes, mox fusciscentes, reticulato-striati, lenticellati. *Folia* oblongo-lanceolata, lanceolata, vel oblanceolata, apice longius acuminata, obtusiuscula vel interdum costa excurrente apiculata, basi cuneata, ad 15 cm. longa et 4·5 cm. lata, sicco supra fusca, subtus pallidiora, pagina superiore glabra, inferiore primo ad costam densius adpresse pubescentia, aliter parce adpresse pubescentia, demum glabra vel pilis paucis adpressis praesertim ad costam instructa, nervis lateralibus utrinque ad 10 intra marginem anastomosantibus, nervulis subtus subconspicuis, iuventute ciliata, petiolo crasso circa 4 mm. longo supra canaliculato subtus transverse corrugato pubescente suffulta. *Flores* viridi-albi (ex Kerr), in cymas paucifloras plus minusve supra-axillares e ramulis hornotinis ortas dispositi; pedunculus communis gracilis, circa 1·5 cm. longus, parce adpresse pubescens; bracteae circa 2 mm. longae, adpresse ferrugineo-pubescentes; pedicelli pedunculo subaequilongi, superne gradatim incrassati, subglabri vel parce adpresse pubescentes, fere ad medium bracteola solitaria instructi. *Sepala* 3, deltoidea, acuta, circa 3 mm. longa et 2·25 mm.

lata, matura reflexa, dorso pubescentia, intra glabra. *Petala* 3 exteriora late ovata vel elliptico-ovata, subacuminata, subacuta, distincte nervosa, 15 mm. longa, 11 mm. lata, ciliata, 3 interiora ungui circa 12 mm. longo suffulta, limbo 8 mm. longo 6 mm. lato intra parce pubescente, glandula horizontali. *Stamina* 6, staminodiis evolutis cito deciduis. *Carpella* 6, sericea, 1.5 mm. alta, ovulis 6 uniseriatis.

Pattani, Kao Kalakiri, c. 300 m., evergreen forest, *Kerr* 7752.

***Alphonsea pallescens* Craib** [Anonaceae-Miliuseae]; ab *A. Maingayi* Hook. f. et Th. foliis tenuioribus, floribus minoribus recedit.

Arbor circa 9 m. alta (ex *Kerr*); ramuli primo dense ferrugineo-pubescentes, mox puberuli vel tomentelli, cortice cinereo-brunneo conspicue lenticellato obtecti. *Folia* oblonga, elliptico-oblonga, rarius late oblanceolata, apice acuminata, obtusa, basi rotundata vel rarius cuneata, saepe inaequilateralia, 6.5–12.5 cm. longa, 2.5–5.3 cm. lata, chartacea, supra ad costam tomentella vel densius breviter pubescentia, aliter glabra, subtus sicco pallide brunnea, ad costam pilis longiusculis divergentibus sat dense, ad nervos pilis brevioribus hic et illic instructa, nervis lateralibus utrinque 10–14 bene intra marginem anastomosantibus supra subconspicuis interdum hic et illic parum elevatis subtus prominulis, costa subtus prominente, ciliata, petiolo 3–4 mm. longo terete indumento ei ramulorum simili tecto suffulta. *Flores* ramulis novellis gesti, oppositifolii. *Sepala* circa 2 mm. longa, basi connata, dorso dense adpresse pubescentia, intra glabra, ciliata. *Petala* basi saccata, dorso dense adpresse pubescentia, mox apice recurva, exteriora circa 1.4 cm. longa et 8 mm. lata, intra densius puberula, interiora exterioribus paulo breviora, intra apice puberula. *Stamina* parva, loculis inferne paulo divergentibus. *Carpella* 2.75 mm. alta, sericea, stylo brevi glabro, stigmate subcapitato, ovulis biseriatis. *Fructus* e carpellis ambitu oblongis 2.7 cm. longis 1.8 cm. diametro breviter ferrugineo-tomentellis stipite 6 mm. longo indumento simili oblecto suffultis constitutus.

Pattani, Banang Sta, c. 300 m., evergreen forest, *Kerr* 7425.

***Viola angkae* Craib** [Violaceae]; a *V. Davidii* Franchet calcare brevi, a *V. bulbosa* Maxim. sepalis longioribus angustioribus recedit.

Herba nana, caulibus ad 6 cm. longis glabris. *Folia* oblata, basi cordata, apice saepissime breviter acuminata, ad 1.2 cm. longa et 2.4 cm. lata, sicco subcoriacea, supra marginem versus pilis paucis instructa, subtus glabra, e basi 5-nervia, nervis utrinque subconspicuis, margine crenulata, basalia petiolo ad cm. 5.5 longo, superiora petiolo saepissime 5–10 mm. longo suffulta; stipulae 2–2.5 mm. longae, circa 1.5 mm. latae, apice paucidenticulatae, summo apice hydathodo-apiculatae. *Flores* lutei, purpureo-lineati (ex *Kerr*), axillares, pedicellis ad 1.5 cm. longis

glabris suffulti. *Sepala* inter se subaequalia, circa 4 mm. longa et 0.75 mm. lata, glabra, hydathodo-apiculata, basi brevissime producta. *Petala* superiora oblongo-obovata, apice rotundata, 6 mm. longa, 2.6 mm. lata, lateralia superioribus similia sed paulo latiora, infimo lateralibus simili nisi paululo breviora; calcar obtusum, circa 1.5 mm. longum. *Filamenta* brevia, antheris circa 0.8 mm. longis, appendice 0.5 mm. longa. *Ovarium* glabrum, stylo 1.5 mm. longo. *Capsula* 6 mm. longa, straminea; semina subellipsoidea, circa 1.5 mm. longa.

Doi Angka, Pa Ngêm, c. 2100 m., between tufts of short grass on open slope, *Kerr* 6312.

***Rinorea fistulosa* Craib** [Violaceae]; a speciebus aliis ad *Prothesiam* pertinentibus ramulis fistulosis recedit.

Frutex circa 1 m. altus (ex *Kerr*); ramuli fistulosi, primo breviter adpresse pubescentes, mox puberuli, lenticellis subconspicuis. *Folia* oblongo-oblancheolata, rarius oblanceolata, apice acuminata, acuta vel subobtusa, basi cuneata vel subacuminata, haud rarius inaequilateralia, 14.5–21 cm. longa, 3.5–6 cm. lata, chartaceo-membranacea, supra iuventute ad costam puberula, mox glabra, subtus pallidiora, matura ad costam nervosque laterales pilis paucis sat rigidis instructa, nervis lateralibus utrinque 12 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervulis subtus prominulis, margine serrulata; petioli ad 12 mm. longi, indumento ei ramulorum simili instructi; stipulae deciduae, setaceae, 5 mm. longae. *Inflorescentia* axillaris, petiolo brevior, subsessilis; pedicelli 2–3 mm. longi, subglabri. *Sepala* quadrato-ovata, obtusa, 1.5 mm. longa, 1.6 mm. lata, ciliolata. *Petala* oblonga, 3 mm. longa, 1.5 mm. lata, inferne ciliolata, dorso medio parce pubescentia. *Discus* crenulatus. *Stamina* et loculis et connectivo appendiculatis. *Ovarium* e disco bene exsertum, superne parce pubescens, stylo petalis breviora glabro.

Nakawn Panom, Muk Tahan, c. 200 m., mixed forest, *Kerr* 8394.

***Rinorea helicterifolia* Craib** [Violaceae]; a *R. anguifera* O. Kze. foliis angustioribus, fructibus minoribus recedit.

Arbor circa 5 m. alta (ex *Kerr*); ramuli primo adpresse fulvo-pubescentes, mox puberuli, pallide brunneo-corticati, lenticellis haud conspicuis. *Folia* lanceolata, late lanceolata, vel rarius oblanceolata, apicem versus angustata vel subacuminata, acuta, basi cuneata, saepissime parum inaequilateralia, 7–15.5 cm. longa, 1.5–3.5 cm. lata, chartacea, supra ad costam inferne parce pubescentia vel fere glabra, subtus pallidiora, ad costam nervosque laterales adpresse pubescentia et ad nervorum axillos pilosa, aliter parce brevius pubescentia, nervis lateralibus utrinque circa 14 intra marginem anastomosantibus supra conspicuis subtus prominentibus, nervis transversis inter se parallelis supra interdum conspicuis subtus prominulis, margine serrulata; petioli circa 5 mm. longi, adpresse pubescentes; stipulae fugaces, circa 4 mm. longae. *Inflorescentia* axillaris, glomerulata, petiolo paulo

longior; bracteae ad 4 mm. longae, dorso pubescentes, medio carinatae, intra brevius adpresse pubescentes, ciliatae. *Sepala* exteriora obovato-elliptica, apice rotundato-truncata, interdum retusa, 5 mm. longa, 4.5 mm. lata, dorso pubescentia, intra breviter pubescentia, ciliata. *Petala* 8 mm. longa, circa 2 mm. lata, dorso medio hirsuta. *Discus* 1.5 mm. altus. *Filamenta* 4.5 mm. longa, glabra, loculis inferne divergentibus, connectivo appendiculato. *Ovarium* hirsutum, disco inclusum; stylus circa 6 mm. longus, pubescens. *Capsula* 2 cm. longa, muscosa.

Pattani, Bukit, c. 300 m., evergreen forest, *Kerr* 7092.

Scyphellandra Marcanii *Craib* [Violaceae-Alsodeieae]; a *S. Pierrei* H. de Boiss. foliis maioribus, floribus racemosim dispositis, filamentis bene evolutis distincta.

Ramuli iuventute puberuli, demum glabri, parum angulati, cinereo-corticati, striati, lenticellis haud conspicuis. *Folia* oblongo-elliptica vel oblongo-lanceolata, apice acuminata, obtusa, costa excurrente apiculata, basi parum inaequilateralia, cuneata, 4.5–11.5 cm. longa, 2.5–5 cm. lata, membranacea, pagina superiore ad costam nervosque laterales parce puberula, inferiore in nervorum axillis breviter barbata et ad nervos parce puberula vel fere glabra, nervis lateralibus utrinque 8–12 intra marginem anastomosantibus supra conspicuis subtus prominulis, nervulis pagina utraque conspicuis vel subconspicuis, crenato-serrata, petiolo circa 2 mm. longo supra canaliculato puberulo subtus pilis sparse instructo vel fere glabro suffulta; stipulae deciduae, 1.5–3 mm. longae. *Racemi* e ramulis defoliatis orti, pedunculo communi brevi incluso circa 3 cm. longi, rhachi et pedicellis densius puberulis; bracteae 1.5 mm. longae, scariosae, extra sparse adpresse pubescentes, intra glabrae, ciliatae; bracteolae 2, vix 1 mm. longae, ima basi pedicelli sitae, ciliatae, medio carinatae; pedicelli bracteis aequilongi. *Sepala* ovata, apice rotundato-obtusa, 1.5 mm. longa, paululo ultra 1 mm. lata, dorso breviter adpresse pubescentia, intra glabra, ciliata. *Petala* subviridia (ex *Marcan*), oblonga, vix 2 mm. longa, 1 mm. lata, ciliolata, extra parce breviter pubescentia, intra glabra. *Filamenta* circa 0.75 mm. longa, dorso basi glandula parva instructa; antherae basi barbatae, appendice triangulari membranacea, loculis breviter aristatis. *Ovarium* glabrum, stylo circa 1.5 mm. longo.

Kaw Chang, dry stream bed, *Marcan* 1324.

Pittosporum Kerrii *Craib* [Pittosporaceae]; ab affini *P. floribunda* Wight et Arn. foliis crassioribus, inflorescentia brevior angustior indumento densiore, fructibus maioribus inter alia recedit.

Arbor parva (ex *Kerr*); ramuli iuventute densius ferrugineo-tomentosi, mox glabri, cinereo-corticati, conspicue lenticellati. *Folia* alterna, subopposita, vel subverticillata, saepissime late oblanceolata, apice obtuse acuminata, basi cuneata, 4–9 cm. longa, 1.5–2.5 cm. lata, coriacea, primo supra dense adpresse pilosa,

subtus parcius pilosa, matura glabra, costa supra impressa subtus prominente, nervis lateralibus utrinque 8–10 supra impressis subtus prominulis, nervulis rete subgracile supra conspicue impressum subtus parum prominulum efficientibus, margine integra, recurva; petiolus usque ad 1.5 cm. longus, superne lamina decurrente alatus, supra canaliculatus, maturus glaber, fuscus. *Inflorescentia* terminalis, pyramidalis, breviter pedunculata, circa 3 cm. longa et 2 cm. diametro, pedunculis partialibus inferioribus trifloris circa 6 mm. longis, pedicellis 2–3 mm. longis, rhachi pedunculis pedicellisque ferrugineo-tomentosis, bracteis circa 4–5 mm. longis mox deciduis, floribus pallide luteis (ex *Kerr*). *Sepala* 2–3 mm. longa, 1.6 mm. lata, medio incrassata, marginem versus membranacea, ciliata, dorso plus minusve glabrescentia, intra glabra. *Petala* lineari-oblonga, 7 mm. longa, 2.5 mm. lata, apice recurva, glabra, costa prominente. *Filamenta* glabra, 4.75 mm. longa, antheris 1.75 mm. longis. *Ovarium* stipite crasso incluso 2 mm. altum, basi ferrugineo-tomentosum, aliter fere glabrum, sulcatum, 2-loculare, loculis biovulatis, stylo glabro 3 mm. longo. *Capsula* circa 8 mm. longa, aperta apice circa 12 mm. diametro, seminibus 4 rubris glutinosis.

Doi Chiengdao, c. 1800–1900 m., *Kerr* 5559, 6580.

***Polygala ardisioides* Craib** [Polygalaceae]; a *P. crotalarioide* Ham. foliis maioribus supra fere glabris, caulium indumento tenuiore facile distinguenda.

Caules erecti, circa 20 cm. alti, straminei, crispatis pubescentes, primo angulati, mox teretes. *Folia* oblanceolata vel oblongo-oblanceolata, apice breviter acute acuminata, basi cuneata, usque ad 7.7 cm. longa et 2.6 cm. lata, chartacea, supra matura fere glabra nisi marginem versus pilis paucis instructa et saepe ad costam parce puberula, interdum pustulata, subtus pilis paucis hic et illic instructa, costa supra impressa subtus prominente, nervis lateralibus utrinque 6–8 intra marginem anastomosantibus supra conspicuis vel subconspicuis subtus subconspicuis vel fere obscuris, nervulis obscuris, margine integra, ciliata, petiolo 1–1.5 mm. longo sparse crispatis puberulo suffulta. *Racemi* axillares, 1–2 cm. longi, pedunculo communi circa 1 mm. longo suffulti, pedunculo et rhachi indumento ei caulis simili tectis; bractee bracteolaeque persistentes, ad 1 mm. longae, membranaceae, sparse pubescentes; pedicelli circa 2.5 mm. longi, sparse crispatis puberuli. *Sepala* ciliata, antica subelliptica, circa 2.25 mm. longa et 1.5 mm. lata, costa dorso prominente, lateralia subrotundata, circa 4 mm. diametro, breviter apiculata, stipite brevi lato suffulta, postico circa 2.75 mm. longo cucullato. *Corolla*, crista inclusa, circa 6 mm. longa; petala postica inter se libera, basi cum aliis connata, parte libera carina paululo breviora basi densius breviter pubescente; crista 2 mm. longa, e basi pluri-ramosa, ramis fimbriato-lobatis. *Filamenta* glabra, parte libera circa 1 mm. longa, antheris parvis. *Ovarium* 1 mm. altum, margine ciliatum, stylo superne incrassato, stigmatibus

2-lobato, lobo supremo elongato infimo brevi. *Capsula* vix matura, alata, ciliata, nervosa.

Near WangChao, c. 100 m., dry mixed jungle, *Kerr* 4571.

***Calophyllum sangkae* Craib** [Guttiferae-Calophylleae]; ab affini *C. pisifero* Planchon et Triana foliis oblongis recedit.

Arbor circa 5 m. alta (ex *Kerr*); ramuli iuventute ferrugineo-tomentosi, angulati, cito ad angulos glabri et lutei, demum puberuli, cortice cinereo vel fusco-cinereo obtecti, lenticellis haud conspicuis; alabastra terminalia ambitu lanceolata vel ovata, 3-4.5 mm. longa. *Folia* saepissime oblonga, rarius elliptico-oblonga vel suboblonga, rarissime lanceolata, utrinque rotundata vel basi late cuneata, 5-10.5 cm. longa, 1.5-2.8 cm. lata, rigida, pagina utraque sicco viridia, matura pagina superiore basi breviter pilosa, aliter glabra vel saepissime praesertim ad costam pilis paucis brevibus instructa, inferiore ad costam praesertim inferne ferrugineo-pilosa, aliter pilis brevibus pallidioribus plus minusve deciduis sparse instructa, nervis lateralibus inter se parallelis et sat distantibus pagina utraque prominulis, margine anguste cartilaginea; petiolus 2-5 mm. longus, ferrugineo-tomentoso-pilosus, supra canaliculatus. *Racemi* laterales, 5-9-flori, foliis saepissime dimidio breviores, primo ferrugineo-pilosi, pedunculo communi brevi, pedicellis ad 1 cm. longis. *Fructus* ellipsoideus, apiculatus, circa 9 mm. longus.

Surin, Sangka, c. 300 m., by stream, *Kerr* 8283.

***Adinandra coarctata* Craib** [Ternstroemiaceae-Ternstroemiaceae]; ab affini *A. villosa* Choisy pedicellis brevibus distinguenda.

Arbor circa 4 m. alta (ex *Kerr*); ramuli iuventute dense adpresse fulvo-pilosi, mox tomentelli, demum glabri, cortice cinereo vel cinereo-brunneo obtecti, lenticellis conspicuis. *Folia* oblongo-elliptica vel suboblonga, apice obtuse acuminata, basi cuneata vel rotundato-cuneata, 6-9.5 cm. longa, 2.5-4.5 cm. lata, coriacea, sicco supra saepissime fusciscentia, subtus fulva, supra glabra, subtus maculata, ad costam dense fulvo-pilosa, aliter pilis brevioribus adpressis sparse instructa et plus minusve glabrescentia, costa supra impressa pustulata subtus prominente, nervis lateralibus utrinque circa 10 aliis paululo minus conspicuis interpositis intra marginem anastomosantibus pagina superiore subprominulis inferiore prominulis, nervulis pagina utraque saepissime subprominulis, margine recurva, conspicue dense ciliata, denticulata sed dentibus ob marginem recurvam et pilos densos obscuris, petiolo crasso 5-7 mm. longo indumento ei ramulorum simili tecto plus minusve glabrescente suffulta. *Flores* axillares, solitarii, pedicello crasso recurvo circa 5 mm. longo dense fulvo-piloso suffulti; bracteae 2, oppositae, ad pedicelli apicem positae, deciduae vel saepe post anthesin persistentes, oblongae vel oblongo-ovatae, 3.5 mm. longae, 3 mm. latae, dorso pilosae, intra glabrae, ciliatae. *Sepala* coriacea, exteriora inter se parum inaequalia, 9-10 mm. longa, 8-9 mm. lata,

dorso tenuiter pilosa, intra glabra, late ovata, obtusa, interiora circa 13 mm. longa, dorso pilosa, intra glabra. *Ovarium* circa 4 mm. altum, 4-loculare, dense sericeum, stylo exserto adpresse hirsuto.

Betong, Gunong Ina, c. 1200 m., evergreen forest, *Kerr* 7559.

***Adinandra lutescens* Craib** [Ternstroemiaceae-Ternstroemiaceae]; ab *A. phlebophylla* Hance petalis apice longius attenuatis acutis vel subacutis recedit.

Frutex vel *arbor*, 5-metralis (ex *Kerr*); alabastra terminalia dense adpresse fulvo-pilosa; ramuli primo sericei, angulati, cito tenuiter sericei, mox glabri, cortice brunneo vel fusco-brunneo reticulato-striato obtecti, lenticellis parvis haud conspicuis. *Folia* saepissime oblongo-oblancheolata, apice obtuse acuminata, basi cuneata, haud rarius inaequilateralia, 5.5–10.5 cm. longa, 2.3–3.9 cm. lata, coriacea vel subcoriacea, sicco lutescentia, supra glabra, subtus pallidiora, pilis adpressis sparse tecta, costa supra impressa subtus prominente, nervis lateralibus tenuibus utrinque 10–12 aliis paulo minus conspicuis interpositis intra marginem anastomosantibus pagina utraque conspicuis vel superiore subprominulis, margine ciliata, denticulata; petiolus 2.5 mm. longus, supra canaliculatus, primo subsericeus, mox plus minusve glabrescens. *Flores* axillares, solitarii, pedicello recurvo 1.5–2.5 cm. longo superne incrassato adpresse pubescente suffulti; bracteolae 2, oppositae, ad apicem pedicelli positae, deciduae. *Sepala* inter se subaequalia, circa 1 cm. longa, dorso adpresse pubescentia, intra glabra. *Petala* 1.7 cm. longa, apice longius attenuata, acuta vel subacuta, dorso medio adpresse pubescentia, basi inter se coalita. *Filamenta* circa 3.5 mm. longa, apice densius hirsuta, antheris (acumine oculis subaequilongis incluso) 6 mm. longis dorso hirsutis, acumine apice glabro. *Ovarium* sericeum, 2-loculare, stylo basi sericeo superne tenuiter sericeo.

Pattani, under 50 m., common in scrub, *Kerr* 7828. Pattani, Banang Sta., c. 50 m., evergreen forest, *Kerr* 7274.

***Ancistrocladus carallioides* Craib** [Ancistrocladaceae]; ab *A. extenso* Wall., *A. pinangiano* Wall., et *A. cochinchinense* Gagnep. inflorescentia contracta conspicue lignosa recedit.

Frutex scandens; ramuli glabri, unciferi internodiis elongatis, foliiferi internodiis contractis, cortice brunneo vel fusco-brunneo obtecti. *Folia* oblanceolata vel oblongo-oblancheolata, apice breviter obtuse acuminata, interdum rotundata et retusa, basi attenuato-acuminata, 9.5–30 cm. longa, 4–8 cm. lata, chartacea vel subcoriacea, glabra, pagina utraque sed praesertim superiore copiose punctata, inferiore parum pallidiora, costa supra conspicua subtus prominente, nervis lateralibus utrinque circa 10–16 aliis minoribus interpositis rectis inter se parallelis bene intra marginem anastomosantibus pagina utraque prominulis, margine integra, cartilaginea, subsessilia. *Inflorescentia* ramulos abbreviatus terminans, subsessilis vel breviter pedunculata, pluries dichotome

furcata, circa 6 cm. longa et 7 cm. lata, pedunculis omnibus robustis valde lignosis, floribus subsessilibus, bracteis deltoideis circa 1 mm. longis margine fimbriatis. *Sepala* oblonga, apice rotundata, 4 mm. longa, 2 mm. lata, coriacea, glabra. *Petala* contorta, 4.75 mm. longa, 3 mm. lata, sat rigida. *Stamina* 10, brevia, filamentis basi complanatis. *Styli* circa 1 mm. longi.

Nan, Doi Tiu, c. 900 m., secondary growth, *Kerr* 5053.

***Decaschistia eximia* Craib** [Malvaceae-Hibisceae]; ab affini *D. siamensi* Craib foliis supra molliter stellato-pubescentibus distinguenda.

Frutex circa 1.5 m. altus (ex *Kerr*); ramuli primo dense subasperius stellato-pubescentes, pallide fulvi, mox fuscescentes, breviter tomentelli. *Folia* saepissime oblonga vel lanceolato-oblonga, interdum oblongo-elliptica vel obovata, superiora lanceolata vel linearia, haud rarius inaequilateralia, apice obtusa rotundatave, interdum breviter apiculata, basi cuneata vel rotundata, 4-9.8 cm. longa, 2-4.8 cm. lata, vel superiora circa 5 mm. lata, crassiuscula, supra pallide viridia, molliter stellato-pubescentia, subtus subalbida vel pallide fulva, densius molliter stellato-pubescentia, costa supra saepe impressa subtus prominente basi glandulosa, e basi 3- vel 5-nervia, nervis secundariis (e costa ortis) utrinque 3-6 intra marginem anastomosantibus supra saepissime leviter impressis subtus prominulis, nervulis reticulationem laxam supra impressam subtus minus prominulam efficientibus, margine parte dimidia superiore serrulata, inferiore subintegra, petiolo 0.8-2.5 cm. longo apice incrassato-geniculato indumento ei ramulorum simili oblecto suffulta; stipulae diu persistentes, angustae, integrae vel haud rarius 2-3-lobatae, 9-12 mm. longae. *Flores* lutei, oculo atro-purpurei (ex *Kerr*), in foliorum superiorum axillis solitarii, sicco ad 9 cm. diametro, pedicello 3-8 mm. longo dense stellato-pubescente suffulti; bracteolae 10, circa 11 mm. longae, basi breviter connatae, persistentes. *Calyx* 5-lobatus, 10-costatus, bracteolis subaequilongus, lobis late triangularibus subacutis basi circa 7 mm. latis dorso cum bracteolis dense stellato-pubescentibus intra superne adpresse pubescentibus margine mox recurvis. *Corolla* ante anthesin dense fulvo-pubescentis, nervis prominulis; petala obovata, circa 3 cm. lata. *Filamenta* brevia, sicco fusca. *Stylus* fuscus, oculo subaequilongus; stigmata pilosa. *Capsula* calyce inclusa, dense fulvo-hirsuta.

Korat, Pak Tong Chai, c. 200 m., edge of open forest, *Kerr* 8124.

***Grewia Winitii* Craib** [Tiliaceae-Grewieae]; a *G. sessilifolia* Gagnep. foliis maioribus magis rotundatis recedit.

Suffrutex dioicus, caulibus numerosis circa 1 m. altis (ex *Winit*), ramulis gracilibus dense puberulis et pilis longiusculis divergentibus brunneis tectis demum plus minusve glabrescentibus. *Folia* rotundata vel rotundato-ovata, apice acuta, saepe acuminata, basi cordata, inaequilateralia, 8-15 cm. longa, 6.5-12.

cm. lata, chartacea vel chartaceo-membranacea, supra primo puberula praetereaque pilis elongatis instructa, mox ad costam nervosque puberula et pilis elongatis sparsis instructa, aliter pilis elongatis hic et illic instructa, subtus molliter pilosa, e basi 5-nervia, nervis cum costa supra plus minusve impressis subtus prominentibus, nervis secundariis (e costa ortis) utrinque circa 5 supra plus minusve impressis subtus prominentibus, nervulis rete gracile supra subprominulum efficientibus, margine crenato-serrata vel denticulato-serrata, petiolo circa 3 mm. longo dense piloso suffulta; stipulae deciduae. *Pedunculi* axillares fasciculati vel subsolitarii, 4-4.5 cm. longi, cymam paucifloram umbelliformem gerentes; pedicelli circa 1 cm. longi, cum pedunculis indumento ei ramulorum simili tecti; bracteae deciduae, angustae, circa 8 mm. longae. *Sepala* 10 mm. longa, 1.6 mm. lata, dorso puberula et pilis elongatis instructa, margine superne incurva. *Petala* 4-5 mm. longa, 1 mm. lata, unguiculata, dorso breviter pubescentia, intra glabra nisi ad unguis apicem barbato-pilosa. *Androphorum* apice pilis paucis erectis instructum, aliter glabrum. *Stamina* floris masculi sepalis paulo breviora, antheris parvis. *Ovarium* dense hirsutum, stylo glabro, stigmatibus fimbriato-capitato sepalis subaequalto. *Fructus* 4-lobatus, nitido-stramineus, parce pilosus.

Lampun, Mè Li, c. 450 m., *Winit* 341, 341A. Lampang, Mè Luang, *Winit* 650.

Colona elobata Craib [Tiliaceae - Grewieae]; ab affini *C. floribunda* (Kurz) Craib petiolo brevior, foliis rarissime lobulatis subtus vix scabris, fructu maiore recedit.

Arbor circa 15 m. alta (ex *Kerr*); ramuli pilis stellatis densis subscabridi, mox scabridi, brunneo-corticati. *Folia* oblonga, oblongo-ovata, vel oblongo-obovata, apice acuminata, basi cordata, saepissime conspicue inaequilateralia, usque ad 24 cm. longa et 16.5 cm. lata, chartacea, supra viridia, pilis stellatis sparse hirsuta, subscabrida, subtus pallida, pilis stellatis mollioribus densius tecta, e basi 3-nervia, nervis supra conspicuis subtus prominentibus, nervis transversis inter se parallelis supra conspicuis subtus prominulis, nervulis gracilibus pagina utraque plus minusve conspicuis, margine denticulata, interdum superne obsolete lobulata, petiolo crasso ad 2 cm. longo indumento ei ramulorum simili tecto suffulta; stipulae deciduae, late triangulares, basi cordatae, circa 12 mm. longae et 10 mm. latae. *Paniculae* et in axillis supremis et terminales, e cymis trifloris bracteatis constitutae. *Fructus* trialatus, ad 1.8 cm. longus et 4.2 cm. (alis inclusis) latus, breviter stellato-pubescent.

Dan Sai, Kao Keo Kang, c. 1100 m., on old clearing, *Kerr* 5802.

Corchorus siamensis Craib [Tiliaceae-Tilieae]; a *C. urticifolia* Wight et Arn. habitu graciliore, indumento sparsiore, foliis basi haud cordatis recedit.

Herba, ut videtur, annua; caulis gracilis, 30-45 cm. altus, simplex vel pauci-ramosus, stramineo-viridis, unilateraliter pilosus.

Folia ovata vel lanceolato-ovata, apice acuminata, acuta, basi rotundata vel fere truncata, rarius cuneato-rotundata, usque ad 7 cm. longa, et 3.2 cm. lata, membranacea, sicco viridia, subtus parum pallidiora, supra pilis sat rigidis sparse instructa, subtus ad costam nervosque pilis similibus sparse instructa, e basi 3-nervia vel obscure 5-nervia, nervis secundariis (e costa ortis) utrinque 6-8 pagina utraque subobscuris vel inferiore subprominulis, margine crassius serrata vel crenato-serrata, petiolo ad 12 mm. longo apice geniculato-incrassato supra densius piloso suffulta; stipulae angustae, circa 3 mm. longae, margine setosae. *Flores* lutei (ex *Kerr*), oppositifolii, solitarii vel gemini, pedunculo communi brevi, pedicellis circa 2 mm. longis. *Capsula* viridis, (acumine circa 3 mm. longo incluso) ad 2.7 cm. longa, pilis rigidiusculis sparse instructa, in valvas tres loculicide dehiscens; semina fusca, angulata, verruculosa.

Ban Na Gorge, c. 150 m., mixed jungle, *Kerr* 3040. Raheng, Doi Tung Cha (or Prachao Luang), c. 350 m., bamboo jungle, *Kerr* 4599.

Schoutenia peregrina *Craib* [Tiliaceae-Tilieae]; a *S. hypoleuca* Pierre foliis minoribus recedit.

Arbor circa 4-8 m. alta; ramuli iuventute pilis brevibus stellatis brunneis dense instructi, mox subcinereo-corticati. *Folia* saepissime oblongo-oblancoolata, apice breviter obtuse acuminata, basi parum inaequilateralia, rotundata vel cuneato-rotundata, 4-8.3 cm. longa, 1.6-3.2 cm. lata, subcoriacea, supra primo pilis stellatis brevibus conspersa, matura nisi basem versus glabra, subtus pallida, pilis brevibus brunneis stellatis plus minusve deciduis instructa et breviter adpresse albo-tomentosa, e basi 3-5-nervia, costa supra impressa subtus prominente, nervis subtus prominulis, nervis secundariis (e costa ortis) utrinque circa 5 intra marginem anastomosantibus supra hic et illic subconspicuis subtus prominulis margine integra vel saepissime superne crenulato-denticulata, petiolo circa 5 mm. longo subterete indumento ramulorum suffulta; stipulae angustae, deciduae, 5 mm. longae, indumento ei ramulorum simili tectae. *Flores* lutei, odorati, in cymas axillares densas vel subdensas dispositi; bractae angustae, circa 2.5 mm. longae; pedicelli circa 8 mm. longi, basem versus bracteolis 1-2 deciduis bracteis similibus instructi. *Calyx* 7 mm. longus, paulo ultra medium 5-lobatus, lobis triangularibus obtusiusculis basi 3.5 mm. latis, dorso pilis brunneis stellatis conspersus, intra marginem versus pilosulus. *Petala* deficientia. *Discus* brevis, pilosus, ad calycem adnatus. *Filamenta* glabra, calycem paululo superantia, antheris circa 1 mm. longis. *Ovarium* depresso-globosum, 1.5 mm. altum, dense albido-hirsutum; stylus 2 mm. longus, glaber, stigmatibus recurvis conspicue papillois. *Fructus* ellipsoideus vel obovoideo-ellipsoideus, usque ad 1 cm. longus, brunneo-stellato-pubescent, calyce persistente.

Bangkok, under 5 m., cultivated, *Kerr* 4433, 4433a, *Marcan* 1399. Chiangmai, 300 m., cultivated, *Winit* 335.

Sloanea Kerrii Craib [Elaeocarpaceae]; a *S. Hanceana* Hemsl. foliis subintegris, a *S. assamica* K. Sch. foliis minoribus basi angustatis recedit.

Arbor circa 15 m. alta (ex *Kerr*); ramuli grabri, primo straminei, sulcati, mox pallide brunnei, conspicue lenticellati. *Folia* obovato-oblanceolata, rarius subobovata, apice acuminata, costa excurrente apiculata, basem versus angustata, haud rarius acuminata, ima basi rotundata vel cordatula, 7-17 cm. longa, 2.8-6.8 cm. lata, rigide chartacea, supra glabra vel ad costae imam basem puberula, subtus pallidiora, glabra, costa supra conspicua subtus prominente, nervis lateralibus utrinque 8-9 intra marginem conspicue anastomosantibus supra gracilibus conspicuis subtus prominentibus, reticulatione supra interdum conspicua subtus prominula, margine integra vel subintegra, anguste cartilaginea; petiolus 1-4.5 cm. longus, supra, interdum apicem versus tantum, canaliculatus, apice basique incrassatogeniculatus, apicem versus puberulus vel fere glaber; stipulae setaceae, circa 3-4 mm. longae, interdum persistentes. *Capsula* pedicello axillari 3-5 cm. longo suffulta, processibus gracilibus breviter hirsutis stramineis circa 2 cm. longis dense tecta.

Dan Sai, Pu Lom Lo, c. 1000 m., evergreen by stream, *Kerr* 5789.

Elaeocarpus Lacei Craib [Elaeocarpaceae]; ab affini *E. hainanense* Oliver pedicellis fere glabris, ovario glabro recedit.

Frutex circa 3 m. altus (ex *Kerr*); ramuli glabri, apice resinosi, cortice brunneo vel cinereo-brunneo obtekti. *Folia* ad apices ramulorum disposita, lanceolata vel anguste lanceolata, apice obtusa, basi angustata, 7-12 cm. longa, 1.5-3 cm. lata, subcoriacea, supra glabra, subtus parum pallidiora, inconspicue sparse breviter adpresse pubescentia vel subglabra, nervis lateralibus utrinque 16-20 supra conspicuis subtus prominulis, margine serrulata, recurva, petiolo 5-10 mm. longo supra canaliculato puberulo vel glabro basi geniculato-incrassato suffulta; stipulae saepissime deciduae, circa 3 mm. longae. *Racemi* infra folia orti, bracteis foliaceis persistentibus ovatis vel oblongo-ovatis usque ad 1.8 cm. longis et 1 cm. latis sessilibus margine argute serratis utrinque sparse breviter pubescentibus vel subglabris, circa 4-flori, pedicellis circa 2 cm. longis puberulis superne incrassatis; alabastra ambitu lanceolata, conspicue acuminata, circa 2 cm. longa, puberula. *Sepala* punicea (ex *Kerr*), ad 2.4 cm. longa et 0.5 cm. lata, lanceolata, acuta, dorso puberula, intra medio basi et superne breviter pilosa, aliter puberula, margine breviter dense tomentella. *Petala* alba (ex *Kerr*), sepala vix aequantia, apice saepissime bilobata, lobis saepe iterum lobatis, fimbriata, extra inferne sericea, apice sparse sericea, intra basi dense pilosa, apicem versus glabrescentia. *Stamina* petalis paulo breviora, antheris puberulis, loculo uno apice longe aristato. *Ovarium* glabrum.

Chiengmai, Mê Chem, c. 600 m., edge of stream, *Kerr* 5412.

Distr. Upper Burma. *Lace*.

III.—SOUTH AFRICAN PLANTS AT THE BRITISH EMPIRE EXHIBITION.

One of the most remarkable features in the South African Government Pavilion at Wembley was the weekly display of fresh wild flowers in the Cape Town Section. These cut flowers were transmitted in the cold storage room of the Union Castle steamers and a regular supply arrived every week as fresh as if they had been newly picked. The general public showed very great interest in this exhibit of indigenous Cape plants, whose beauty and attractiveness were enhanced by the tasteful arrangement in the vases by Mr. Dunsdon, of Caledon, Cape Province.

It is much to be regretted that the cultivation of these remarkable plants has nearly died out in this country, and it is to be hoped that the consignors of the plants to Wembley will continue their good work and help to fill our cool greenhouses with some of the beautiful *Ericaceae* and *Proteaceae*, which were such a conspicuous feature in our gardens in the early part of the last century. In the year 1810 no less than 23 species of *Protea* were in cultivation at Kew, and up to 1823 there were twelve species figured in the Botanical Magazine. Between the years 1797 and 1804 Andrews' Botanical Repository contained coloured drawings of 23 species, which shows how very popular these plants were during that period. Andrews' Heathery contains pictures of a great number of species of *Erica* from South-Western Cape Colony, which in the number of its *Ericaceae* rivals Western China with its Rhododendrons, the latter now holding the field in popular esteem.

The Exhibition was already far advanced before it was realised that there might be many rare species amongst the plants displayed, and it was not until the 18th September that the first visit was paid. Thereafter weekly supplies were generously given to Kew and a total of 143 different species and varieties were added to the herbarium collections. These are enumerated below, and it is interesting to note that previously several were represented in the herbarium only by single specimens, and in the case of some species of *Leucadendron*, in which the flowers are dioecious, either the male or female plant has been obtained now for the first time.

ENUMERATION OF PLANTS OBTAINED.

Polygalaceae—*Muraltia Heisteria* DC.

Rhamnaceae—*Phylica capitata* Thunb., *P. stipularis* L.

Leguminosae—*Aspalathus cricaefolia* L., *A. sericea* Berg.

Bruniaceae—*Berzelia commutata* Lond., *B. lanuginosa* Brogn., *Brunia albiflora* Phillips, *B. nodiflora* L.

Compositae—*Anaxeton arborescens* Cass., *Helichrysum felinum* Less., *H. foetidum* Cass., *H. fruticans* Less., *H. mucronatum* Less., *H. sesamoides* Thunb., *H. vestitum* Less., *Helipterum canescens* DC., *H. eximium* DC., *H. speciosissimum* DC., *H. virgatum* DC., *Metalasia muricata* Less., *M. rosea* DC., *M. umbellata* Don, *Phaenocoma prolifera* Don, *Stoebe cinerea* Thunb.

Ericaceae—*Erica axilliflora* Bartl., *E. bruniades* L., *E. campanulata* Andr., *E. colorans* Andr., *E. corifolia* L., *E. cruenta* Sol., *E. cubica* L., *E. cumuliflora* Salisb., *E. curviflora* L., *E. curviflora* var. *sulphurea* Bolus, *E. fastigiata* L., *E. fastigiata* var. *coventryana* Bolus, *E. foliacea* Andr., *E. hirtiflora* Curt., *E. holosericea* Salisb., *E. imbricata* L., *E. intervallaris* Salisb., *E. lanuginosa* Andr., *E. parilis* Salisb., *E. parviflora* L. var. *tenuifolia* Bolus, *E. perspicua* Wendl., *E. perspicua* var. *lanceolata* Bolus, *E. Petiveri* L., *E. physodes* L., *E. Pillansii* Bolus, *E. Plunkeneti* L., *E. Plunkeneti* var. *bicarinata* Bolus, *E. propendens* Andr., *E. pubigera* Salisb., *E. pyramidalis* Soland., *E. regia* Bartl., *E. regia* var. *variegata* Bolus, *E. scariosa* Thunb., *E. sessiliflora* L., *E. sitiens* Klotzsch, *E. spumosa* L., *E. tegulaefolia* Salisb., *E. tenuis* Salisb., *E. viridipurpurea* L., *E. Walkeria* Andr.

Solanaceae—*Solanum tomentosum* L.

Thymelaeaceae—*Lachnaea Meisneri* var. *major* C. H. Wright.

Santalaceae—*Grubbia rosmarinifolia* Berg.

Proteaceae—*Leucadendron adscendens* B. Br., *L. argenteum* R. Br., *L. crassifolium* R. Br., *L. daphnoides* Meisn., *L. glutinosum* Hutch., *L. ovale* R. Br., *L. plumosum* R. Br., *L. salignum* R. Br., *L. squarrosus* R. Br., *L. Stokoei* Phillips, *L. strictum* R. Br., *L. uliginosum* R. Br., *L. venosum* R. Br., *L. sp. nr. decurrens* R. Br., *Leucospermum attenuatum* R. Br., *L. buxifolium* R. Br., *L. cartilagineum* Phillips, *L. conocarpum* R. Br., *L. crinitum* R. Br., *L. ellipticum* R. Br., *L. incisum* Phillips, *L. lineare* R. Br., *L. nutans* R. Br., *L. reflexum* Buek, *Mimetes hirta* Knight, *M. integra* Hutch., *M. lyrigera* Knight, *Nivenia parvifolia* R. Br., *Orothamnus Zeyheri* Pappe, *Protea acaulis* Thunb., *P. asper* Phillips, *P. barbiger* Meisn., *P. calocephala* Meisn., *P. compacta* R. Br., *P. cordata* Thunb., *P. decurrens* Phillips, *P. glabra* Thunb., *P. latifolia* R. Br., *P. Lepidocarpodendron* L., *P. mellifera* Thunb., *P. neriifolia* R. Br., *P. pendula* R. Br., *P. pityphylla* Phillips, *P. recondita* Buek., *P. rosacea* L., *P. scabra* R. Br., *P. Scolopendrium* R. Br., *P. scolymocephala* Reichard, *P. speciosa* L., *Serruria artemisiacifolia* Knight, *S. elongata* R. Br., *S. Knightii* Hutch., *S. subsericea* Hutch., *S. ventricosa* Ph. & Hutch., *Spatalla Galpinii* Phillips.

Haemodoraceae—*Lanaria lanata* Dur. & Schinz.

Restiaceae—*Elegia equisetacea* Mast., *E. juncea* L., *E. parviflora* Kunth., *E. stipularis* Mast., *Hypodiscus argenteus* Mast., *H. aristatus* Nees var. *bicolor* Mast., *H. binatus* Mast., *Thamnochortus cernuus* Kunth., *T. dichotomus* R.Br., *T. floribundus* Kunth., *T. fruticosus* Berg., *T. imbricatus* Mast.

Cyperaceae—*Tetraria Rottboellii* C. B. Clarke, *T. ustulata* C. B. Clarke.

Gramineae—*Andropogon eucomis* Nees., *Aristida capensis* Thunb., *Danthonia cineta* Nees., *D. stricta* Schrad.

Filices—*Aspidium capense* Willd.

J. H.

IV.—NOTES ON MADEIRA PLANTS.

("St. George" Pacific Expedition, 1924.)

L. A. M. RILEY.

The "St. George" dropped anchor off Funchal on April 27th after a voyage of eighteen days from Dartmouth.* The streets are paved with cobbles and support a considerable amount of vegetation consisting of *Coronopus procumbens* Gilib. and a small *Amarantus*, thus presenting quite a comfortable green appearance. The public gardens were vivid with species of *Jacaranda*, *Erythrina*, *Cordia*, *Thunbergia*, *Allamanda*, *Echium*, *Salvia* etc., and the private gardens also were a mass of colour, the sight of the latter reviving my old enthusiasm for growing tropical plants in a temperate climate. In the afternoon I walked to a small bay about two miles west of the town. Here cultivation extended nearly to the edge of the cliffs, but there was a narrow strip of short pasture composed mainly of *Scorpiurus sulcata* L., *Plantago Lagopus* L., *Tunica prolifera* Scop., *Silene gallica* L. and various grasses. Although this association presented a compact appearance, there was practically no soil, only a few loose scoriae. The introduced *Oxalis cernua* Thunb. was very plentiful but always the double form (forma *pleniflora* Menezes). I searched in vain for the single form and am under the impression that it is rare in Madeira.† *Stachys hirta* L. was also very plentiful; indeed it appeared to be the commonest plant in the lower parts of the island. *Ranunculus muricatus* L. grew in masses in a damp place, this bay being one of the few localities in Madeira for the species. *Matthiola maderensis* Lowe occurred on the face of the cliffs, and after some scrambling I managed to acquire some good material.

* See *Kew Bull.*, 1924, 174.

† Lowe, *Man. Fl. Madeira*, i. 100, 595; Menezes, *Fl. Arch. Madeira*, 35.

Among the more interesting plants growing on the foreshore were *Euphorbia platyphyllos* L., *E. Terracina* L., and *Lotus glaucus* Ait., the latter thrusting its woody underground system deep into rocky crevices whence I disengaged it with considerable expenditure of time and energy. In this respect it resembles *L. corniculatus* L., to obtain complete specimens of which entails minor quarrying operations.

On the following day I drove to Machico, a coast village about fifteen miles east of Funchal. The road led entirely through cultivated country, but in many places passed through cuttings or across gorges, where I collected *Sonchus pinnatus* Ait. and *Euphorbia piscatoria* Ait. The *Sonchus* is a handsome plant with a woody stem 4-5 ft. high somewhat branched above, the deep green leaves being clustered toward the ends of the branches which terminate in ample golden inflorescences. This and the *Euphorbia* bled profusely, and subsequently proved most troublesome to dry. *Jasminum odoratissimum* L. occurred between Funchal and Caniço.

From Machico I walked to Caniçal, a coast village about five miles distant as the crow flies but actually much further on account of the repeated ascents and descents of the rough path, some of which amounted to nearly a thousand feet. Caniçal itself offered little of botanical interest, as the soil consists of nothing but lava and volcanic tuff, and vegetation was consequently very scanty. At the highest point reached—above Machico—I discovered *Centaurium maritimum* (L.) Fritsch, this being a new locality for Madeira. It grew associated with *Scorpiurus sulcata* L., *S. vermiculata* L., and *Lotus uliginosus* Schkuhr. The shrubby *Hypericum glandulosum* Ait., *Phyllis Nobla* L., and *Micromeria thymoides* Webb et Berth. grew among rocks. Lower down were *Plantago maderensis* Decne., a curious suffruticose plantain growing in rocky crevices, *Cynoglossum creticum* Mill., *Achyranthes aspera* L., and *Isatis praecox* Kit. I also obtained good specimens of *Tolpis succulenta* var. *multifida* Lowe, a small ligulate composite about ten inches high with an amazingly hard gnarled woody base. There were several bushes of *Gomphocarpus fruticosus* R. Br. which, although certainly introduced, had every appearance of being indigenous. *Convolvulus althacoides* L. sprawled everywhere, the vivid carmine flowers retaining most of their colour when dry. A plant which strikes the eye vividly in Madeira is *Gladiolus segetum* Ker. This is common in the island even at the thousand foot level. There seems no doubt, however, that it is not a native, and vestiges of cultivation can usually be traced even in its wildest habitats.

On April 30th I accompanied a motor-car expedition into the interior of the island to the Cumeada de S. Vicente. On the way, at Ribeira Brava, high on the inaccessible face of a cliff I saw *Dracaena Draco* L., the famous Dragon Tree of the Atlantic Islands. There was a single large branched tree with

a slender unbranched one beneath it. Menezes* mentions that this species grows in a wild state in four localities, but I was credibly informed that there is now only one other wild tree in existence in Madeira.

At Ribeira Brava the road turns inland and ascends steadily for seven miles up to the pass. At a height of 2000 feet I saw a cliff white with *Saxifraga maderensis* D. Don., and here also was growing *Arabis albida* Stev. The Saxifrage seems to prefer a situation facing due north, where it is not troubled by too much sunlight; it is very viscid and most tenacious of life in the drying press. At about 2500 feet the hills are covered with a thick scrub consisting of *Vaccinium maderense* Link, *Erica scoparia* L. and *Laurus canariensis* Webb et Berth. Above 3000 feet the *Laurus* begins to disappear, and at the summit of the pass, 3400 feet, it is completely absent. Here, in open grassy places, I found *Teesdalia nudicaulis* R. Br. and *Viola Riviniana* Reichb., the latter with extremely large flowers.

The last thousand feet of the ascent from the south is somewhat arid, the *Vaccinium* and the *Erica* not growing higher than 4-5 feet. But on descending the northern slope towards S. Vicente evidence of moister conditions is immediately apparent. Ferns are among the undergrowth, and the *Vaccinium* and *Erica* are covered with grey lichens. The former grows 9 or 10 feet high, while the latter attains a height of over 20 feet with trunks more than one foot in diameter. On this slope *Laurus canariensis* makes its appearance much sooner. There is also a considerable amount of *Ulex europaeus* L., which, introduced into Madeira about 1810, was almost confined to the neighbourhood of the Palheiro and Camacho in 1826, and by 1860 had spread over the open mountain pasture region almost throughout the island.† I continued down a rough goat-track with thick *Vaccinium-Erica* scrub high on each side. Some bushes of *Myrica Faya* Ait. put in an appearance at 3000 feet. At first I could not find any flowering material, but, on descending, the shrub became more common and I found plenty in flower. At 2000 feet I saw *Sibthorpia peregrina* L., a peculiarly delicate and graceful plant with flowers of an ethereal shade of yellow. It was a lengthy matter collecting sufficient flowering material of this species, as it seems to be a shy flowerer. Between 2000 and 1500 feet I suddenly struck a rich flora. Within a few yards of each other were *Helichrysum melanophthalmum* DC., *Chrysanthemum pinnatifidum* L. f. and *Teucrium abutiloides* L'Hérit. The *Teucrium* is very rare, and I saw only one plant. On the return journey I stopped the car once before reaching the pass in order to collect the very rare *Rhamnus glandulosus* Ait., a small tree, up which I had to climb to obtain flowering material. Near by was

* Fl. Arch. Madeira, 171 (1914).

† Lowe, Man. Fl. Madeira, i. 121.

Euphorbia mellifera Ait., one of the shrubby species endemic in the Atlantic islands.

A short distance above Ribeira Brava we stopped to collect specimens of the azure-blue *Echium nervosum* Ait., which grew on almost precipitous cliffs overhanging the road. After scaling the cliff for about twenty feet, I still was unable to reach the *Echium*, and was compelled to enlist the services of some natives who had gathered in a grinning crowd below. A curved knife at the end of a long pole was produced, and the plants were cut down with this. I collected here some more material of *Phyllis Nobla* L. This, from a height above sea-level of only a hundred feet, showed much laxer and larger inflorescences and longer internodes than the specimens collected above Machico at a height of nearly a thousand feet.

The "St. George" sailed for Trinidad on May 1st. In view of the short duration of the visit the results obtained were gratifying. New localities were discovered for the rare *Centaurium maritimum* Fritsch and *Teucrium abutiloides* L'Hérit., and of the more important endemic plants the material collected considerably supplements that already preserved in the herbaria at Kew and the British Museum.

I wish to express my thanks to the Rev. A. Drummond Paterson, the Minister of the Scotch church, and to Senhor A. de Noronha, the curator of the Museum, who aided me in every way, and to the Minister of Agriculture, Madeira, who kindly presented me with a copy of Menezes' Flora, which I found of most valuable assistance.

The first set of herbarium specimens has been presented by the Scientific Expeditionary Research Association to the Kew Herbarium and the second set to the British Museum.

In the list which follows the specimens were collected in a flowering condition unless stated to the contrary. In order to economize space, the following abbreviations are employed :

L.—Lowe, Manual Flora of Madeira (1857-72).

M.—Menezes, Flora do Archipelago da Madeira (1914).

LIST OF PLANTS COLLECTED.

Ranunculus muricatus L. ; L. i. 6 ; M. 8.

Damp places in pastures on cliffs east of Ponta Gorda, fl. and fr., no. 2.

Matthiola maderensis Lowe ; L. i. 20 ; M. 12.

Cliffs east of Ponta Gorda, no. 1.

Arabis albida Stev. ; L. i. 24 ; M. 14.

Valley of Ribeira Brava, 600 m., fl. and fr., No. 53.

Teesdalia nudicaulis (L.) Br. ; L. i. 33 ; M. 19.

Encumeada de S. Vicente, 1020 m., no. 55.

Isatis praecox *Kit.* ; L. i. 36 ; M. 19.

Between Machico and Caniçal, fl. and fr., no. 25.

Viola Riviniana *Reichb.* ; L. i. 44 ; M. 21.

Encumeada de S. Vicente, 1020 m., no. 54.

Tunica prolifera (*L.*) *Scop.* ; L. i. 50 ; M. 23.

Dry pastures on cliffs east of Ponta Gorda, no. 9.

Silene gallica *L.* ; L. i. 50 ; M. 23.

Dry pastures on cliffs east of Ponta Gorda, fl. and fr., no. 6.

Hypericum glandulosum *Ait.* ; L. i. 76 ; M. 29.

Rocky places above Machico, 300 m., no. 26.

Linum gallicum *L.* ; L. i. 96 ; M. 32.

Above Machico, 250 m., no. 29.

Rhamnus glandulosus *Ait.* ; L. i. 110 ; M. 38.

Encumeada de S. Vicente, 900 m., no. 44.

Psoralea bituminosa *L.* ; L. i. 134 ; M. 49.

Between Funchal and Caniço, no. 37.

Lotus glaucus *Ait.* ; L. i. 173 ; M. 48.

Rocky crevices on shore east of Ponta Gorda, fl. and fr., no. 15.

Scorpiurus sulcata *L.* ; L. i. 186 ; M. 50.

Rocky crevices and cliffs east of Ponta Gorda, fl. and fr., no. 14.

Lathyrus Clymenum *L.* ; L. i. 214 ; M. 53.

Between Funchal and Caniço, fl. and fr., no. 40.

Saxifraga maderensis *D. Don* ; L. i. 340 ; M. 64 ; Engl.

Pflanzenr. Saxifragac.-Saxifraga, 332.

Valley of Ribeira Brava, 600 m., no. 52.

Sempervivum villosum *Ait.* ; L. i. 330 ; M. 67.

Shady rocky ledges and moist places between Machico and Caniçal, no. 19, 22, 31. Valley of Ribeira Brava, 750 m., no. 57.

An extensive range of development is shown by these numbers. No. 57 is a sturdy much branched plant 11 cm. high and 11 cm. in width, while no. 31 is a dwarf unbranched plant from 1.3 to 2 cm. high and proportionately smaller in all its parts. The former was growing in a dry rocky place and the latter occurred in a small bog.

Myrtus communis *L.* ; L. i. 267 ; M. 69.

Between Machico and Caniçal, no. 18.

Phyllis Nobla *L.* ; L. i. 385 ; M. 82. Ribeira Brava, 30 m., no. 43. Between Machico and Caniçal, 300 m., no. 27.

Two collectings of considerably different appearance. In

no. 43 the leaves are up to 11 cm. long and 2 cm. wide, and the flowering portion of the branches is up to 19 cm. long with lateral branches up to 6 cm. In no. 27 the corresponding measurements are 6.5 cm., 1.8 cm., 8 cm., and 2 cm. In both cases the habitat was very dry, though more exposed in the case of no. 27, which has remarkably short internodes in the upper part of the branches.

Eupatorium adenophorum Spreng. ; L. i. 435 ; M. 85.

Cliffs east of Ponta Gorda, no. 3.

Helichrysum melanophthalmum (Lowe) DC. ; L. i. 482 ; M. 88.

Valley of S. Vicente, 540 m., no. 46.

Chrysanthemum pinnatifidum L. f. ; L. i. 460 ; M. 91.

Valley of S. Vicente, 600 m., no. 48.

Galactites tomentosa Moench ; L. i. 496 ; M. 96.

Among rocks on shore east of Ponta Gorda, no. 8.

Tolpis succulenta (Ait.) Lowe, var. **multifida** Lowe, Man. Fl.

Mad. i. 527 (1868).—*T. succulenta* var. *pectinata* (Lowe)

Menezes, Fl. Arch. Mad. 99 (1914). *Crepis succulenta*

Ait. Hort. Kew. ed. 1, iii. 128 (1789). *C. pectinata* Lowe,

Primit. Fl. Mad. 24 (1831). *T. pectinata* DC. in DC.

Prodr. vii. 87 (1838).

Between Machico and Caniçal, 180 m., no. 32.

Tolpis succulenta, as circumscribed by Lowe and Menezes, includes two apparently distinct species, namely, *T. succulenta* proper (*T. pectinata* DC.) and *T. fruticosa* Schrank. The whole of the material of *T. succulenta* sensu lato at Kew and at the British Museum may without hesitation be referred to one or the other, and it is therefore convenient to treat them as independent species. *T. filiformis* (Ait.) DC. is a mere form of *T. succulenta* with entire or subentire leaves. *T. succulenta*, as here understood, includes var. *a. multifida* Lowe and var. *γ. linearifolia* Lowe, while *T. fruticosa* comprises var. *β. ligulata* Lowe and var. *δ. oblongifolia* Lowe. It is significant that Menezes re-arranged these varieties as follows : A. *pectinata* (= *multifida*), B. *filiformis* (= *linearifolia*), C. *ligulata*, D. *fruticosa* (= *oblongifolia*). Varieties A and B belong to *T. succulenta*, while C and D are referable to *T. fruticosa*. Lowe originally recognised the two species in his Primit. Fl. Mad. 24 (1831), but subsequently united them.

Both A.P. De Candolle in DC. Prodr. vii. 87 (1838) and Schultz Bipontinus in Webb et Berth. Phytogr. Canar. ii. 399 (1836–50) treated *T. succulenta* (which they respectively named *T. pectinata* and *T. filiformis*) and *T. fruticosa* as independent species.

Lowe in 1831 described typical *T. succulenta* as a new species, *Crepis pectinata*, but in 1868 correctly designated it as *T. succulenta* var. *a. multifida*. The Hortus Kewensis sheet of

Crepis succulenta in the British Museum should be regarded as the type.

Sonchus pinnatus *Ait.* ; L. i. 550 ; M. 104.

Between Funchal and Caniço, no. 39.

Wahlenbergia lobelioides (*L.*) *DC.* ; L. i. 572 ; M. 105.

Between Funchal and Caniço, fl. and fr., no. 38.

Vaccinium maderense *Link* ; L. i. 580 ; M. 107.

Encumeada de S. Vicente 1020 m., no. 49. Mountains above Funchal, 1350 m., no. 35.

Erica scoparia *L.* ; L. ii. 5 ; M. 108.

Encumeada de S. Vicente, 900 m., no. 51.

In this locality there were growing examples of this species 20 feet in height with trunks 1 foot in diameter. In most cases the trees were covered with a mass of grey lichen.

Jasminum odoratissimum *L.* ; L. ii. 29 ; M. 111.

Between Funchal and Caniço, fl. and fr., no. 41.

Gomphocarpus fruticosus (*L.*) *R. Br.* ; L. ii. 47 ; M. 113 ;
Dyer Fl. Cap. iv. sect. 1, 691.

Between Machico and Caniçal, no. 24.

Centaureum maritimum (*L.*) *Fritsch* ; L. ii. 41 ; M. 113.

Above Machico, 250 m., no. 30.

This is a rare species in Madeira. Lowe, followed by Menezes, cites two localities only, Pico do Arrebentão and Pico da Silva, both in the region above Funchal. The locality above Machico represents a considerable extension of distribution in the island.

Cynoglossum creticum *Mill.* ; M. 114.

Between Machico and Caniçal, no. 21.

Echium nervosum *Ait.* ; M. 115 ; De Coincy in Bull. Herb. Boiss. sér. 2, iii. 264.

On precipitous cliffs, Ribeira Brava, 30 m., no. 34.

Convolvulus althaeoides *L.* ; L. ii. 58 ; M. 117.

Between Machico and Caniçal, no. 20.

Nicotiana glauca *Graham* ; L. ii. 113 ; M. 122 ; Comes, Monogr. Nicotiana, 27 (1899).

By ruins of old fort east of Ponta Gorda, no. 13.

Sibthorpia peregrina *L.* ; M. 129.

Valley of S. Vicente, 600 m., no. 56.

Micromeria thymoides (*R. Br.*) *Webb et Berth.* ; M. 140.

Near Machico, no. 28.

Stachys hirta *L.* ; M. 143.

Cliffs east of Ponta Gorda, fl. and fr., no. 16.

Teucrium abutiloides *L' Hérít.* ; M. 145.

Valley of S. Vicente, 600 m., no. 47.

T. abutiloides is very rare according to Menezes, who cites only two localities, namely, Fonte dos Vinhaticos em S. Gonsalo (on the authority of Moniz) and Serra de S. Jorge.

Plantago Lagopus *L.* ; M. 147.

Among rocks on shore east of Ponta Gorda, also on cliff pastures, no. 12.

P. Coronopus *L.* ; M. 147.

Among rocks on shore east of Ponta Gorda, no. 7.

P. maderensis *Decne.* ; M. 147.

Between Machico and Caniçal, fr., no. 23.

Achyranthes aspera *L.* ; M. 150.

Between Machico and Caniçal, fl. and fr., no. 33.

Laurus canariensis *Webb et Berth.* ; M. 158.

Mountains above Funchal, 1350 m., no. 36.

Euphorbia mellifera *Ait.* ; Boiss. in DC. Prodr. xv. pars. 2, 108 ; M. 160.

Encumeada de S. Vicente, 900 m., fl. and fr., no. 45.

E. piscatoria *Ait.* ; Boiss. l.c. ; M. 160.

Between Funchal and Santa Cruz, fl. and fr., no. 17.

E. platyphyllos *L.* ; Boiss. l.c. 133 ; M. 160.

Seashore east of Ponta Gorda, no. 5.

E. Terracina *L.* ; Boiss. l.c. 157 ; M. 161.

Seashore east of Ponta Gorda, fl. and fr., no. 4.

Myrica Faya *Ait.* ; M. 163.

Encumeada de S. Vicente, 900 m., no. 50.

Romulea Columnae *Seb. et Maur.* ; M. 167.

Mountains above Funchal, 1350 m., no. 59.

Lagurus ovatus *L.* ; M. 189.

Ribeira Brava, no. 58.

Cynodon Dactylon (*L.*) *Pers.* ; M. 191.

Among rocks on shore east of Ponta Gorda, no. 11.

Lamarckia aurea (*L.*) *Moench* ; M. 194.

Between Funchal and Caniço, no. 42.

Brachypodium distachyon (*L.*) *Roem. et Schult.* ; M. 198.

Among rocks on shore east of Ponta Gorda, no. 10.

V.—NOTES ON THE FLORA OF THE BALKAN PENINSULA.

W. B. TURRILL.

Abies alba Mill. Gard. Dict. ed. 8 [1768] [*A. pectinata* DC. Fl. Fr. iii. 276 (1805)] var. **acutifolia** Turrill, a planta vulgari foliis apice plus minusve acutis vel breviter acuminatis interdum leviter emarginatis differt.

BULGARIA: Central Rodope; River Gashna, July, 1924, N. Stojanoff and B. Stefanoff.

This plant is very puzzling. At first sight the acute leaves suggest *A. cephalonica* Loud., but the indumentum on the branches and the presence in some of the leaves of a distinct emargination cause me to place it as a variety of *A. alba*.

The taxonomy of the firs of the Balkan Peninsula has not yet been satisfactorily settled. It is evident that the Central European *Abies alba* Mill. extends into the northern and central areas, and that in Peninsular Greece *A. cephalonica* Loud. is the usual species. *A. cephalonica* has been sub-divided by some authors, and an account of it will be found in the Botanical Magazine t. 8691 (1916). From the intermediate areas a number of specimens whose determination is doubtful have been received. Thus in the Kew Herbarium there are specimens from Mount Athos and from the Thessalian Olympus which variously combine the characters of the two species. Two sheets of *Sintenis* 1489, collected from Olympus "prope coenobium Hag. Dionysius," 30.7.1891, consist of three branches, two of which have the shoots markedly hairy and the leaves slightly emarginate, while the third has the shoots very slightly hairy and the leaves acute. Again, we have two sheets of *Sintenis & Bornmüller* 1062, Peninsula Hagion Oros, Kerasia, 20.6.1891. These were named *Abies pectinata* DC., but from the glabrous shoots and acute leaves I determine them as *A. cephalonica* Loud. A third specimen written up *Pinus Picea* L., Athos, in, I believe, the hand-writing of Grisebach has glabrous shoots as in typical *A. cephalonica*, but blunt and emarginate leaves as in *A. alba*! Judging from the remarks of Grisebach Spic. Flor. Rumel. ii. 351 (1844) he evidently considered that both *A. alba* and *A. cephalonica* (as now understood) occur in the Athos Peninsula. He is very probably correct but I am not yet completely satisfied.

Iberis acutiloba Bert. Misch. Bot. ii. 12, t. ii. f. 1 (1842).
I. odorata Boiss. Diagn. I. i. 75 (1842) et Flor. Or. i. 335 (1867),
vix Linn. Sp. Pl. 649 (1753).

GREEK MACEDONIA: three miles to the east of Salonika, April 23, 1924, Miss N. Lauder Brunton 6.

This species is widely distributed in the Orient, and from the Balkan Peninsula has been recorded from Attica: pr. Heracleon, Kephissia, Amarysia, and Eleusis. The Cretan records are doubtful. Aznavour in Bull. Soc. Bot. France xliv. 166 (1897)

records *I. odorata* from the European side of the Bosphorus, and I have no doubt that the same species is intended.

Onosma echiioides *L. sensu Javorka in Ann. Mus. Nat. Hung. iv. 437 (1906), var. Stojanoffii Turrill, a var. veronense Lacaita et var. angustifolio (Lehm.) Lacaita in Nuovo Giorn. Bot. It. xxxi. 13 (1924) caulibus altioribus, floribus majoribus differt.*

Caulis 5-6 dm. altus, setis adpressis instructus. *Folia* 2 mm. vel vix 2 mm. lata, setis adpressis praedita. *Corollae* 2.1-2.3 cm. longae.

It is possible that with more material available this variety will be accorded specific rank. Apart, however, from the characters mentioned above, the whole facies of the plant is so like that of narrow-leaved plants from Italy and Sicily to which the varietal names *veronense* and *angustifolium* have been applied recently, that I hesitate to do more than call it a variety.

BULGARIA: Ali-Botush, Chengene Kale, 1300 m., 6.7.1920, *N. Stojanoff*.

Aeluropus repens *Parl. Fl. Ital. i. 462 (1820). Dactylis repens Desf. Fl. Atl. i. 79 (1798). Calotheca repens Spreng. Syst. i. 347 (1825).*

This species is widely spread in N. Africa and the Orient and is found in Algeria, Tunis, Egypt, Syria, Cyprus, Arabia, Mesopotamia, Transcaucasia, Persia, Baluchistan and also in India and Tropical Africa. In Europe it has been recorded from Sicily and Lampedusa. In the Alexander Prior herbarium is a specimen of this species written up "Constantinople." If the locality is correctly given this is an interesting new record, but it is strange that the species has not been recorded from the Constantinople district by Aznavour.

VI.—A NEW SPECIES OF NEPENTHES FROM BORNEO.

Whilst working in the Herbarium during 1924 Dr. J. H. Macfarlane, the well-known authority on *Nepenthes*, came across specimens of an undescribed species of the genus. The plant was represented by two sheets and is remarkable for the exceedingly large pitchers and winged stem. Dr. Macfarlane has kindly forwarded the accompanying description and notes.

Nepenthes decurrens *Macfarlane* [Nepenthaceae]; *N. Treubianae* Warb. affinis sed caule 2 cm. crasso acute trigono, alis petiolaribus per internodia duo decurrentibus basi peltatis, operculo basi carinato, inflorescentia ♀ ad 100 cm. longa, pedicellis bifloris distincta.

Plant strong climbing. *Stem* 1.5-2 cm. thick, triangular, with long internodes traversed by three pairs of laminar wings

that are peltate below, when young densely hairy, when mature almost glabrous. *Leaves* large, spreading, lamina to 60 cm. long, 8–10 cm. wide, elliptic-lanceolate, coriaceous, glabrous, brown-punctate below, somewhat abruptly contracted into tendril above: petiolar wings prominent, inclined to the vertical, each pair decurrent almost to second stem-internode below: longitudinal laminar veins conspicuous, disposed in 5–6 pairs, inner pair to 15–20 mm. from midrib and arising about one third from base, 2nd pair 12–18 mm. distant and springing from near the laminar base, 3rd to 6th pairs at decreasing distances and springing from base, transverse veins slightly oblique then almost horizontal: tendril to 30–35 cm. long, cylindric, glabrous, 2 mm. thick below enlarging to 8 mm. above: cauline pitcher to 30 cm. long, 5–6 cm. wide, infundibuliform, ventral wings as ridges below but widened and long-ciliate upward, mouth oblique, ovate; peristome 25–60 mm. wide, sharply ridged, narrowed in front and behind, broadly undulate laterally along the outer margin, green and crimson striped; entire pitcher reddish-green with irregular purple blotches, operculum to 12 cm. long, 8 cm. wide, externally somewhat hirsute, internally thickened along middle line and swollen to basal carina; honey-glands large, oval, sunken in middle, becoming crowded and circular outward, almost absent along sides; pitcher within almost over whole interior glistening, and with abundant small discrete embedded digestive glands.

Inflorescence.—♀ alone known—to 100 cm. long, 1–1.25 cm. thick at base; peduncle, shorter than rhachis, to 45 cm. long, when mature finely hairy to glabrous; flowers loosely spreading mostly biflorous on long pedicels. *Sepals* 4, elliptic, brown-pubescent externally and in margin, internally glabrous with 10–15 large honey-glands at base and 40–50 small glands toward apex. *Ovary* ovoid, four-grooved, brown-pubescent with 4-lobed capitate stigma surrounded by circular ring or disc inside calyx. *Fruit* 25–30 mm. long, lanceolate, brown, shining, sparsely hairy, surrounded at base by persistent disc; seeds to 15 mm. long, yellow.

BORNEO. Sarawak; Barram province, *J. Hewitt* 100!

The above species, which is amongst the largest of the genus in stature, in laminar expanse, in pitchers, and in inflorescence, is only represented by two sheets in Herb. Kew. The large inflorescence is on a separate sheet from the stem and pitched leaf, but all seem to belong together and were collected by Mr. J. Hewitt. The species is most nearly related to *N. Treubiana*.

The inflorescence of *N. decurrens* is highly typical, and for size is only equalled by the totally different one of *N. bicalcarata*. The rather slender elongate peduncle of *N. Northiana* (which I examined years ago in the now extinct Veitch greenhouses) contrasts markedly with that of *N. decurrens*, as does the thin compared with the elongate stout rhachis; the short delicate pedicels that bear one—more rarely two—flowers in *N. Northiana* are also very

different from the long relatively stout biflorous—rarely uniflorous—pedicels of *N. decurrens*. The capsules and seeds are also different.

Two species that undoubtedly show close affinity to the latter are *N. Treubiana* Warb. and *N. Boschiana* Korth., but neither of these show the peltate petiolar wings; the former has no basal keel or carina to the lid; whilst the latter and *N. decurrens* have. The size and disposition of the lid-glands in both differ from those of *N. decurrens*. Their smaller and more delicate fruiting inflorescences also are very different from the luxuriant spreading one of *N. decurrens*.

VII. POISONOUS PLANTS AND THE LIVESTOCK INDUSTRY.

J. BURTT DAVY.

A valuable piece of botanical research has been brought to a successful conclusion with the publication of Sir Arnold Theiler's paper on "Gauwziekte in Sheep," and Dr. Pole Evans' on "Gauwziekte Veld; its Vegetation and Flora," both appearing in the 9th and 10th Reports of the Director of Veterinary Education and Research, Department of Agriculture, Union of South Africa (Pretoria, 1924). The authors of these papers are to be congratulated on the successful result of their investigation and for the patience and perseverance with which it has been conducted under difficult and trying conditions.

The work was tedious, and results were delayed by the fact that toxicity proved an inconstant factor, varying in different years and even in one and the same year; in one year, at least, no cases of gauwziekte occurred on the farms, although these had been selected for the investigation because of their highly toxic character. Toxicity was found to depend upon the quantity of the plant eaten, as well as upon the individual susceptibility of the sheep, and further varied according to the locality where the plant had grown. Under these conditions it became necessary to continue the experiments over a period of ten years before the final conclusions could be drawn.

In the light of these reports on the work done, the remark of Sir Arnold Theiler, that the experiments "met with a considerable amount of difficulty," is distinctly modest.

Some 220 different species were collected on gauwziekte veld, and had to be considered in connection with the possible cause of the disease. Of these, 75 species were found to be common to gauwziekte veld in different parts of the country. Carefully planned feeding tests with 98 distinct species of plants were conducted before *Vangueria pygmaea* (Rubiaceae) was definitely proved the cause of the disease.

This plant contains a toxic principle which acts on the heart,

giving rise to a productive myocarditis, and subsequent dilation of the ventricles, ending most frequently with failure of the heart. In well-developed cases the myocarditis assumes the form of a scar formation, the scar tissue replacing the muscular fibres. The toxin had not been isolated when the Report under review was written.

The term "gauw", meaning quick, refers to the sudden heart-failure; "gauwziekte" implies a disease of rapid course, but, considering all the facts now known, the term "gauw" is not meant to indicate a rapid course of the disease itself, but "an almost sudden *exitus letalis*."

Frequently, under normal conditions, the animals are not observed to be ill, but when handled in the usual way sudden deaths occur. In a number of cases productive processes in the kidneys were described on post mortem, which consisted mainly of round cells, infiltration, and formation of fibroblastic tissue. These are believed to stand in some relation to the toxin itself.

When gauwziekte appears in a flock of sheep it takes the course of an enzootic that resembles one caused by infectious agencies. Some sheep recovered after they had shown distinct symptoms of gauwziekte.

An interesting feature is the delayed action of the toxin. The interval between grazing on toxic veld and actual death was found to range from 34 to 146 days. The latent period was calculated to average about 37 days, and one sheep that received only one feed of the plant died after this period. "From this it would appear that the toxin once taken up in sufficient quantity becomes fixed in the body, probably in the tissue, where it causes all the damage and subsequently slowly gives rise to the inflammatory processes. In this respect it resembles somewhat the diphtheria toxin and the toxins of infectious diseases which also act on the heart and cause similar lesions long after the patient has recovered from the acute attack of the disease."

Delayed toxic action in the case of another poisonous plant is noted by Dr. W. H. Andrews, who in the same volume (pp. 123-220) gives an interesting record of his experiments which led to the isolation of *Matricaria nigellaefolia* (*Compositae*) as the plant causing the so-called "staggers" or "pushing disease" of cattle in Natal. In this disease there was a period of latency that showed the following limits, 23 to 47 days after feeding tests with *Matricaria* commenced, and from 7 to 42 days after they were discontinued. Dr. Andrews concludes that the visible and long-delayed effects of *Matricaria* feeding are the results of the repeated or continued ingestion of the plant, and it is most probable that, at least under natural conditions, no animal ever consumes sufficient in one day to give rise to the intoxication. Also that the process is not a simple matter of the accumulation within the body of some active principle of *Matricaria* in an amount sufficient to exert the toxic action, but that some tissue or tissues suffer an injury that continues to develop after the complete stoppage of further

supplies of the toxic substance drawn from sources outside the animal body.

Perhaps the most striking examples of extremely lengthy latent periods are provided by *Senecio latifolius* (*Compositae*) (see Theiler, 5th and 6th Reports, Director of Vet. Research, S. Africa, 1919), and *Crotalaria dura* (*Papilionaceae*) (see Theiler, 7th and 8th Reports, Director of Vet. Research, S. Africa, 1920).

Very different in its effects on the animal system is the plant known as Gift-blaad (*Dichapetalum cymosum*; family *Chailletiaceae*), of which 2 ounces always caused death and 1½ ounces very often proved fatal in 5 to 10 hours after the plants had been eaten (see Burt Davy in Transv. Dep. of Agric. Report, 1905-06, pp. 117-118).

The seriousness of the injury caused by gauwziekte is indicated by the fact that one farmer alone lost 1,047 sheep (59% of his flock), after grazing them for less than 24 hours on gauwziekte veld. The total annual loss of horses, cattle, sheep and other livestock caused by poisonous plants amounts to hundreds of thousands of pounds. These losses have been going on for so many years that they are accepted by stockmen as one of the inevitable drawbacks to stock-raising. In the palmy days of ranching such losses were ignored. But with lower prices they cause a serious reduction of the annual income of farm and ranch; with increased requirements of foodstuffs, due to rapidly increasing population, they become of vital importance in the national economy.

One is sometimes asked why the farmer and rancher have allowed this state of affairs to continue so long, and in justice to the farming and ranching industries it should be said that it is not from any lack of intelligent interest or endeavour; in fact, one marvels at times at the ingenuity and effort spent in endeavours to save the lives of sick animals. But the methods usually employed are entirely empirical owing to the lack of that scientific knowledge of the cause of the disease which is essential to any reliable method of treatment. Here again the farmer is no more to blame for ignorance of the cause than the average person of intelligence was to blame for his treatment of Yellow Fever before the very modern discovery of the cause of that disease. In the one case, as in the other, the problem can only be solved by the application of science.

Among the important facts brought out in these Reports may be mentioned the necessity for abandoning a working hypothesis which has proved unfruitful, and of returning to one's base to start a fresh line of exploration. The necessity for co-operation in scientific work of this character is also evident. The organization of a Government Department of Agriculture should provide for the co-ordination and full collaboration of its several scientific branches.

The incidence of a disease may be such that it cannot be investigated continuously. In some years no cases of gauwziekte

occurred on the farms, although these had been selected for investigation because of their toxicity. Also cases may occur only at certain seasons of the year. These factors delay the attainment of definite results.

No private farmer, or group of farmers, could carry out such tedious and expensive investigations; the employment of trained veterinarians and botanists over a period of years would be out of the question. The equipment and maintenance of the necessary laboratories and herbaria in the Dominions and Colonies is undoubtedly a legitimate function of Government. These investigations prove clearly that the study of such diseases is a necessity if stock-raising is to continue and develop in what are fast becoming the only areas where land is cheap enough to provide cheap meat, hides and wool. The expenditure on such investigations must necessarily be heavy, but the saving to the industries concerned, on which the human race is so dependent for food and clothing, is incalculably so much greater that it should be looked upon as a sound and profitable investment.

VIII.—MISCELLANEOUS NOTES.

The following appointments have been made by the Secretary of State for the Colonies :—

MR. D. D. PATERSON, B.Sc. (For.), B.Sc. (Agric.), to be Agricultural Inspector, Iraq; MR. W. T. O. MAIDMENT, B.A., MR. J. C. MUIR, B.Sc., MR. F. A. ROBB, B.Sc., to be Probationary Assistant Superintendents, Agricultural Department, Gold Coast; CAPTAIN E. D. HILL, to be Superintendent of Plantations, Cameroons.

LIEUT.-COLONEL SIR DAVID PRAIN, C.M.G., C.I.E., F.R.S., has been appointed a Trustee of the British Museum.

MR. E. LEONARD GILL, Assistant in the Natural History Department of the Royal Scottish Museum, has been appointed Director of the South African Museum in succession to the late DR. L. A. PERINGUEY (*K.B.*1924, p. 171).

MR. C. H. KNOWLES, Deputy Director, has been appointed by the Secretary of State for the Colonies Director of Agriculture, Gold Coast (*K.B.*1921, p. 171; 1924, p. 365).

MR. J. M. F. DRUMMOND, B.A., F.R.S.E., F.L.S., Director of Research, Scottish Society for Research in Plant-Breeding, has been appointed Regius Professor of Botany in the University of Glasgow, in succession to Professor Bower.

MR. S. T. DUNN, who was reappointed to the post of Assistant for India in the Herbarium at Kew in 1919 (*K.B.* 1919, p. 446), has been transferred to the service of the Ministry of Agriculture and Fisheries as a Temporary Botanist. MR. C. E. C. FISCHER has been appointed by the Secretary of State for India in Council to the post vacated by Mr. Dunn.

We record with great regret, as this number goes to the printers, the death, on 30th January, of MR. W. WATSON, for many years Curator of the Royal Botanic Gardens, Kew. A biographical notice will appear in the next number of the Bulletin.

Alyogyne or Allogyne.—Alefeld (*Oesterr. Bot. Zeitschr.* 1863, 12) based a new genus, *Alyogyne*, on *Hibiscus hakeaefolius* (Giordano, which he separated from *Hibiscus* on account of the complete union of the styles and stigmas and other characters. He unfortunately omitted to supply the derivation of the name. *Alyogyne* was treated as a synonym of *Cienfuegosia* (*Fugosia*) until 1915, when it was restored to generic rank by F. L. Lewton (*Journ. Wash. Acad. Sc.* v. 307), who included three other species, *Hibiscus cuneiformis* DC., *H. lilacinus* Lindl., and *H. multifidus* Paxt., in the genus.

Lewton changed the spelling of the name from *Alyogyne* to *Allogyne* on the ground that *Alyogyne* was "evidently printed in error for *Allogyne*, from ἄλλος different, and γυνή stigma." There is no reason, however, for supposing *Alyogyne* to be an error for *Allogyne*. It is obviously derived from ἀ not, λύω I free, and γυνή in allusion to the principal diagnostic character: the presence of a single style and stigma, not five free style-arms and stigmas. The form *Alyctogyne* (from ἄλυκτος indissoluble) would have been better, but there is no adequate reason for changing the spelling *Alyogyne*. "No one is authorised to . . . modify a name . . . because it is badly chosen or disagreeable" (*International Rules*, Art. 50).

T. A. S.

Collecting in Spain.—At the generous invitation of the Rev. Ellman of Bath, Mr. C. E. Hubbard, one of the temporary technical assistants in the Herbarium, accompanied him on a five weeks' collecting expedition to southern and central Spain. Mr. Ellman had made several previous botanical excursions in that country and the object of the present trip was to observe the rarer endemic species growing in their native habitat.

The localities visited were Cordova, Ronda, Algeciras, Malaga, Granada, Almeria, Escorial and La Granja, and from these centres well-known hunting grounds, such as the Sierra de Cordova, Sierra de la Nieve, Sierra de Palma, Gibraltar, Silla del Moro, lower slopes of the Sierra Nevada, Sierra de Guadarrama (Pica de Penalara) etc. were explored.

Close on 1,200 gatherings were made and these contain approximately 850 different species and varieties, the majority of which have been generously presented by Mr. Ellman to the Herbarium, where they will form a valuable addition to the Spanish collections.

Flora Capensis.—This great work, which was commenced with the publication of Volume I by Harvey and Sonder in 1859–60, has now been completed by the publication of Part IV, Section 2 of Volume V in January, 1925. The Preface to the Volume printed with this final part is here reproduced.

“The first Section of Volume V was published in 1912. The second Section, now at last completed, fell under the shadow of the Great War. Two Parts were, however, issued in 1915 of which the contents had been slowly maturing. Of these the Thymelaeaceae were contributed by Mr. C. H. Wright, A.L.S., the Penaeaceae by Miss Edith Layard Stephens, B.A., of the Botany Department, South African College, Cape Town, the Loranthaceae by Mr. T. A. Sprague, F.L.S., and the Santalaceae by Dr. Hill, F.R.S., the Director of the Royal Botanic Gardens, Kew. The vast order Euphorbiaceae, which bulks so largely in South African vegetation, required prolonged study; the genus *Euphorbia* was undertaken by Mr. N. E. Brown, A.L.S., who is an authority without a rival on Succulent Plants, and Sir David Prain, Treas. R.S., divided with Mr. John Hutchinson, F.L.S., the remaining genera. For the present part, Mr. N. E. Brown also undertook Urticaceae and Mr. Hutchinson Myricaceae as well as the genus *Ficus*. The Betulaceae and Salicineae are contributed by Mr. S. A. Skan.

“During the remainder of the War, work on the Flora was in abeyance, but in 1920 a third Part was published not without some difficulty. The cost of printing had enhanced greatly. Part III contained nine sheets and these ‘have cost within a few shillings of the total cost of Parts I and II,’ which aggregate twenty-four sheets.

“The preface to Section 1 commemorated the loss of many whose generous assistance and co-operation have made the preparation of the Flora possible. Two more—and, as will be seen below, both contributors of material—must be added to the obituary list. Henry Harold Welch Pearson, F.R.S., Harry Bolus Professor of Botany in the South African College, and Hon. Director, National Botanic Gardens, Cape Town, died on 3rd November, 1916 (obituary notice and bibliography, *Kew Bulletin*, 1916, pp. 271–281). Sir Isaac Bayley Balfour, K.B.E., F.R.S., Professor of Botany in the University of Edinburgh, died 30th November, 1922 (obituary notice and bibliography, *Kew Bulletin*, 1923, pp. 30–35).

“For the limits of the regions under which the localities are cited, reference may be made to the Preface of Vol. VI; for the maps which have been used to the Preface and Section 1 of Vol. V.

“For the loan or contribution of specimens used in working

out the Orders included in the present Section, Kew is indebted to the following :—

Sir I. B. Balfour. Loan of Euphorbiaceae.

Alwin Berger, La Mortola. Loan and gift of specimens of Euphorbia.

Mrs. F. Bolus. Loan of Santalaceae and Euphorbiaceae from the Bolus Herbarium.

Dr. J. I. Briquet. Loan of Thesium from Boissier Herbarium.

J. L. Drege, Port Elizabeth. Living and dried specimens of Euphorbia.

D. J. W. C. Goethart. Loan of Euphorbiaceae from the Leiden Herbarium.

Dr. Rudolph Marloth, Capetown. Loan and gift of specimens of Euphorbia.

Dr. C. H. Ostenfeld. Loan of Euphorbiaceae from the Universitets Botaniske Museum, Copenhagen.

Prof. H. H. W. Pearson. Living and dried plants collected on a Sladen Expedition.

Dr. A. B. Rendle. Loan of Thymelaeaceae and Euphorbiaceae from British Museum.

Archdeacon F. A. Rogers. Gift of South African plants.

Prof. A. C. Seward. Loan of Santalaceae and Euphorbiaceae from Cambridge University Herbarium.

"I continue to be indebted for invaluable aid to Mr. C. H. Wright, A.L.S., and to Mr. N. E. Brown, A.L.S., the former in reading the proofs and in other ways, the latter for working out the localities and distribution.

"The present Part completing Vol. V, Sect. 2, completes also the enumeration and description of the Flowering Plants of South Africa belonging to Dicotyledones as far as Herbarium material at each moment has been available. Vol. V, Sect. 3, with the two succeeding volumes treats in the same way with the Monocotyledones. The two classes taken together constitute the subdivision of the Vegetable Kingdom, Angiospermae, in which seeds are enclosed in a seed vessel.

W. T. T.-D."

Botanical Magazine.—The first part of volume cl. of the Botanical Magazine was published in December 1924, and contains the following figures of interesting plants :—

Fraxinus Paxiana Lingelsh (t. 9024), a native of Western China and North India; *Hoffmannia Roezlii* Hort. ex Gentil (t. 9025), from Mexico; *Primula Bulleyana* Forrest (t. 9026), from Yunnan and the borders of Szechuan, China; *Buddleia Farreri* Balf. f. & W. W. Smith (t. 9027), also from China, southern Kansu; *Stellera Chamaejasme* Linn. (t. 9028), a native of Central Asia; *Lindmania penduliflora* Stapf. (nov. comb.) (t. 9029), from Peru; *Kleinia stapeliiformis* Stapf. (nov. comb.) (t. 9030), a native of the Waterberg and Lydenburg Districts of the Transvaal; *Rhododendron bracteatum* Rehd. & Wils. (t. 9031), from Western

Szechuan, China ; *Kunzea ambigua* Druce (t. 9032), from South-East Australia ; *Bulbophyllum morphologorum* Kränzl. (t. 9033), from N.W. Siam, and *Coleus pumilus* Blanco (t. 9034), a native of the Philippines and Borneo.

Selection of *Hevea brasiliensis*.—In the *Kew Bulletin* 1919, p. 317, and 1920, p. 113, some particulars are recorded of this subject as a new development in the cultivation of this tree. The latter article, which was based on a paper by Dr. C. Heusser, gave a full account of the selection methods employed in the Dutch East Indies. The same author has now published further observations on the work there being carried out which are of interest as showing the progress that has been made.*

He records that as soon as the experimental station was established in 1917 a number of seeds were received from seven good trees. These were sown and in 1923 tapping on 200 young trees raised from this stock was begun and has been continued regularly. The average production from these trees was 4.02 grams, which he considers to be good when the poor soil in which the trees were growing is considered, and clearly indicates an improvement. The best tree produced 14.69 grams.

Artificial pollination with specially selected trees was undertaken in 1918 and 1919, but only on a small scale. In 1920 it was attempted on a larger basis and large scaffoldings were built around the selected trees to enable these experiments to be carried out. The seed obtained from these various crosses has been sown and the young plants are being kept under observation. By the end of 1925 it is hoped to begin to tap these and so obtain results from trees of known parentage. This will be the first experiment on a large scale whereby the effect of generative selection with seed of known parentage will be able to be ascertained and will tend to confirm or disprove the present idea that propagation must be by vegetative means.

J. H. H.

Farm Soil.†—This book within its compass of 121 pages provides much valuable information on the soil and its improvement by means of cultivation and the application of various manures. An enlightening chapter discusses soil fertility and what it means, the formation of our varying classes of soil and the soil population. Various methods of cultivation and farming are discussed, showing to what extent they are determined by climatic conditions, the average rainfall largely determining the particular style of husbandry as well as the application of manure.

* Mededeelingen van Het Algemeen Proefstation der A.V.R.O.S., Rubber Series No. 41.

† Farm Soil and its Improvement, by Sir John Russell, F.R.S. Ernest Benn, Ltd., 8, Bouverie St., E.C.4. 1923. Price 7s. 6d.

Manures, from the making and storing of farmyard manure to the latest artificial fertilisers, are dealt with, as well as their value for different crops and various classes of soil.

The book is well illustrated and includes a number of informing statistical tables in relation to cultivation and manuring. It is simply and concisely written, and well worth the attention of farmers, and in fact of all who are interested in the cultivation and improvement of the soil.

J. C.

Shrubs for Amateurs.*—This little book of 128 pages has been written by Mr W. J. Bean, Curator of the Royal Botanic Gardens, Kew, for the "Country Life Library" as one of a series of books on popular garden subjects now appearing under the names of various authors. The book well fulfils the object of the author, for the reader gets in a concise manner, without perplexing detail, just the information that the beginner or the owner of a small garden wants. Commencing with notes on cultivation, the author briefly describes the best methods of ground preparation, transplanting, arrangement, pruning, and propagation. He follows with select lists of shrubs for various purposes, such as late and early flowering shrubs, arranged in their months of flowering, selections of twelve good deciduous and twelve good evergreen shrubs, shrubs for shady places, shrubs for the rock garden, shrubs for dry places, shrubs for autumn colour, etc. Then comes a descriptive list of shrubs. Genera are taken in alphabetical order. Each genus occupies a short paragraph and popular descriptions are given of one or two of the best species, followed in some instances by a short list of other species. In the descriptions, technical terms are avoided, the scientific names being the only obstacle to the thorough understanding of the humblest amateur. The book has 15 full page illustrations.

W. D.

Hardy Bulbs.†—This is a book on hardy bulbs written expressly for amateurs, and deals with a selection of the hardiest and most easily grown kinds. It contains 14 illustrations and consists of 26 chapters. There is a chapter devoted to the Narcissus, giving its history and development, followed by a classification of the various kinds, and citing well-known examples of each class. This is followed by cultural hints, and a list of the best kinds for various purposes. Chapters are also devoted to Tulips, Crocuses, Snowdrops, Scillas, Bulbous Irises, Fritillarias, Alliums and Erythroniums among others. Chapter xxv deals

* Shrubs for Amateurs, by W. J. Bean, published by Country Life, Ltd., 20, Tavistock Street, Covent Garden, London, 1924. Price 5s.

† Hardy Bulbs for Amateurs, Country Life, Ltd., 20, Tavistock Street, Covent Garden, London, 1924. pp. 108. Price 5s.

with the culture of bulbs in pots and bowls and contains a list of the most suitable kinds for this purpose. The last chapter gives reasons for the omission of many that are usually included under the heading of hardy bulbs, and mentions several that are only half hardy, or can only be grown in favourable situations. *Liliums* are also excluded in order to keep the book within a reasonable size. The book is well produced with good illustrations, and should be useful to the amateur.

W. T.

Timbers: Their Structure and Identification.*—This work is by Mr. W. S. Jones, of the Welsh Department of the Ministry of Agriculture and Fisheries, and although primarily intended for the use of students of Forestry it will also be found to be of value to students of Pure Botany. It consists of two parts, the first dealing with the general physical, histological, and the less common anatomical characters of timbers, and the latter part with the identification of various types of woods. In the former part the student is made conversant with the various elements present in timber and their relationship to each other, the value of the descriptions being enhanced by drawings and photomicrographs. Part 2 deals with the identification characters of one or more species of a good many families of woods. The order of description is, general distribution, macroscopic characters, microscopic characters, with photomicrographs of transverse and tangential sections. The work is confined to the structural side of timber, neither the silvicultural nor the economic sides receiving attention. There are two appendices to the book, one dealing with the preparation of timbers for microscopic examination, and the other with photomicrography as applied to timber study.

W. D.

Oats.†—Much work has been done in recent years by various botanists and chemists on the varieties of oats, but hitherto the results have been published in Research Station bulletins and scientific journals in the form of papers, chiefly of an advanced technical nature. Recently a most useful introduction to the study of oats in this country has appeared in the form of a small handbook by Mr. H. Hunter. Though the book contains little original information the author has compiled the more technical work of others remarkably well, and has put such information as he includes in a form easily accessible to farmers, for whom the work is principally intended. The introductory portion on "botanical characters" is an excellent account in simple language.

* *Timbers, their Structure and Identification*, by W. S. Jones. Published at the Clarendon Press, Oxford. Price 15s.

† *Oats: Their varieties and characteristics*, by Herbert Hunter, with an Introduction by R. H. Biffen. Small 8vo., 131 pp. and 4 plates. Ernest Benn, Ltd., London, 1924. Price 8s. 6d. net.

Chapters iv and v, which together cover some 43 pages of the book, are devoted to an enumeration of the species and varieties respectively, the classification followed being practically that of the more technical papers published by other authors (although this is not stated) simplified to meet the case of the selected number of varieties described. Most of the principal varieties of *Avena sativa* are included, although only one variety derived from *A. sterilis* is described.

The chemical composition is fully dealt with in a complete chapter, at the end of which is a summary of cultivated varieties with special reference to their suitability to different classes of soil and conditions of climate. "Seed Selection" and the "Production of Pure Seed" are likewise adequately dealt with in the two concluding chapters.

C. V. B. M.

Plant Diseases.*—No branch of botany has made more rapid strides during the past ten years than Plant Pathology, and text books as soon as they are written tend to become out of date. A comprehensive text-book on the subject is urgently needed, but owing to the vastness of the field no one author during recent years has attempted to cover the whole. For this reason introductory works or works covering portions of the field are welcome.

The present volume deals with Mycology and the more common diseases of English horticultural and agricultural crops, and presents the subject in a lucid and concise style. It is divided into two parts, part 1, serving as an introduction, dealing with Mycology in general and selected types of fungi, and part 2 with the description of the most important plant diseases in this country and the methods of controlling them. The work forms one of the most useful volumes covering the precise field, and will be of value to all students requiring a concise introduction to the subject.

Timbers of Tropical America.†—The approaching exhaustion of the virgin forests of the United States has served as a powerful stimulus to the exploitation and investigation of the forest resources of tropical America. "The most serious hindrance to the introduction of tropical hardwoods into new fields is the lack of information concerning them. A manufacturer is concerned, not only with the properties of his woods, but also with their source and the probability of continuous supply. . . . This

* Outlines of Fungi and Plant Diseases. By F. T. Bennett. London, Macmillan and Co., 1924. Price 7s. 6d.

† By Samuel J. Record and Clayton D. Mell. New Haven: Yale University Press. London: Humphrey Milford, Oxford University Press. Pp. xviii. + 610, plates 50, 1924. Price \$10.

book is designed to meet this need in part, to serve at least as a starting point for more detailed investigations. . . . It is divided into two parts, the first of which deals with the tropical American countries and their forests, and is largely in the nature of an introduction to the descriptions of the trees and their woods in the second part. . . . Part I [pp. 1-82] is exclusively the work of Mr. Mell, formerly Assistant Dendrologist in the U.S. Forest Service, and more recently engaged in reconnaissance work on timberlands in various parts of tropical America. His field investigations have taken him into all parts of the West Indies, Mexico, Costa Rica, Panama, Colombia, Venezuela, the Guianas, Brazil, and other parts of South America." Part II [pp. 83-560] is mainly the work of Mr. Record, who is Professor of Forest Products at Yale University. "It deals with 75 families having trees growing naturally in tropical America, emphasis being placed upon those of greatest interest from a commercial standpoint. The general plan followed is to introduce each family with a brief consideration of its size, distribution, and economic importance, attention being directed to some of the best known members as a basis for identification and comparison. This is usually followed by a summary of the salient structural features of the woods, after which the more important genera and species are dealt with. The sequence of the families is according to the classification of Engler and Gilg (1912). In most cases the number of species accredited to a family or genus is derived from the Index Kewensis." The descriptions of the woods are subdivided under the following headings: Common names, General properties, Growth rings, Parenchyma, Pores, Vessel lines, Vessel contents, Rays, Ripple marks, Gum ducts, Minute anatomy, and Remarks.

The work is clearly printed, and the illustrations are good—it is a pity, however, that more could not have been supplied. There is only one index, comprising the common names in addition to the scientific ones. To many, this will be not the least valuable feature of the book, as affording a rapid means of identification, though one that must be used with discretion, since the same vernacular name is often applied to several entirely different woods. Authors and publishers alike are to be congratulated on the production of a valuable and attractive work of reference.

T. A. S.

The Annual Review of the work of the Staff at Kew, which has hitherto been published in the first number of the *Kew Bulletin* each year, is now being published separately as Appendix II.